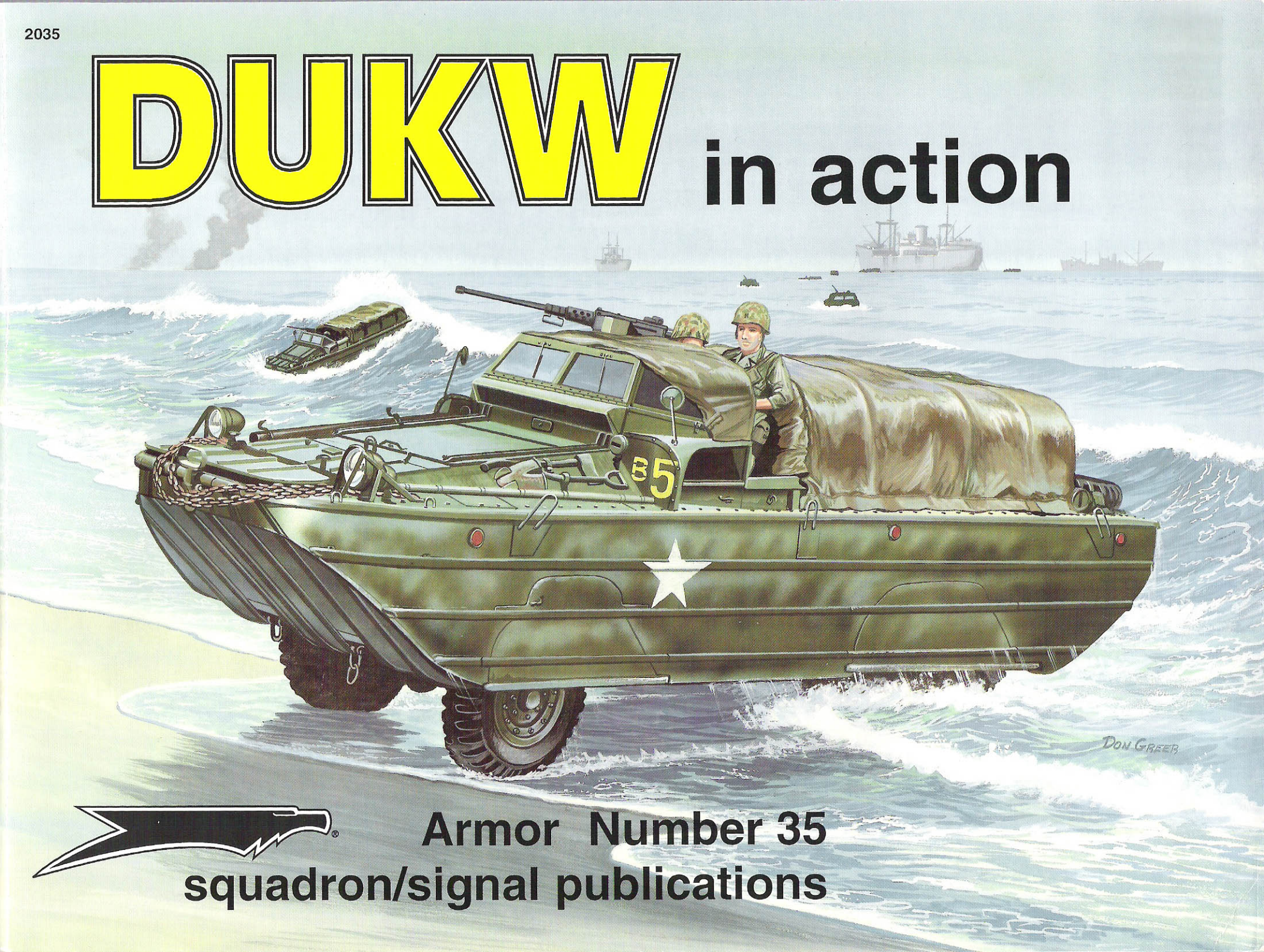
2035

DUKW in action



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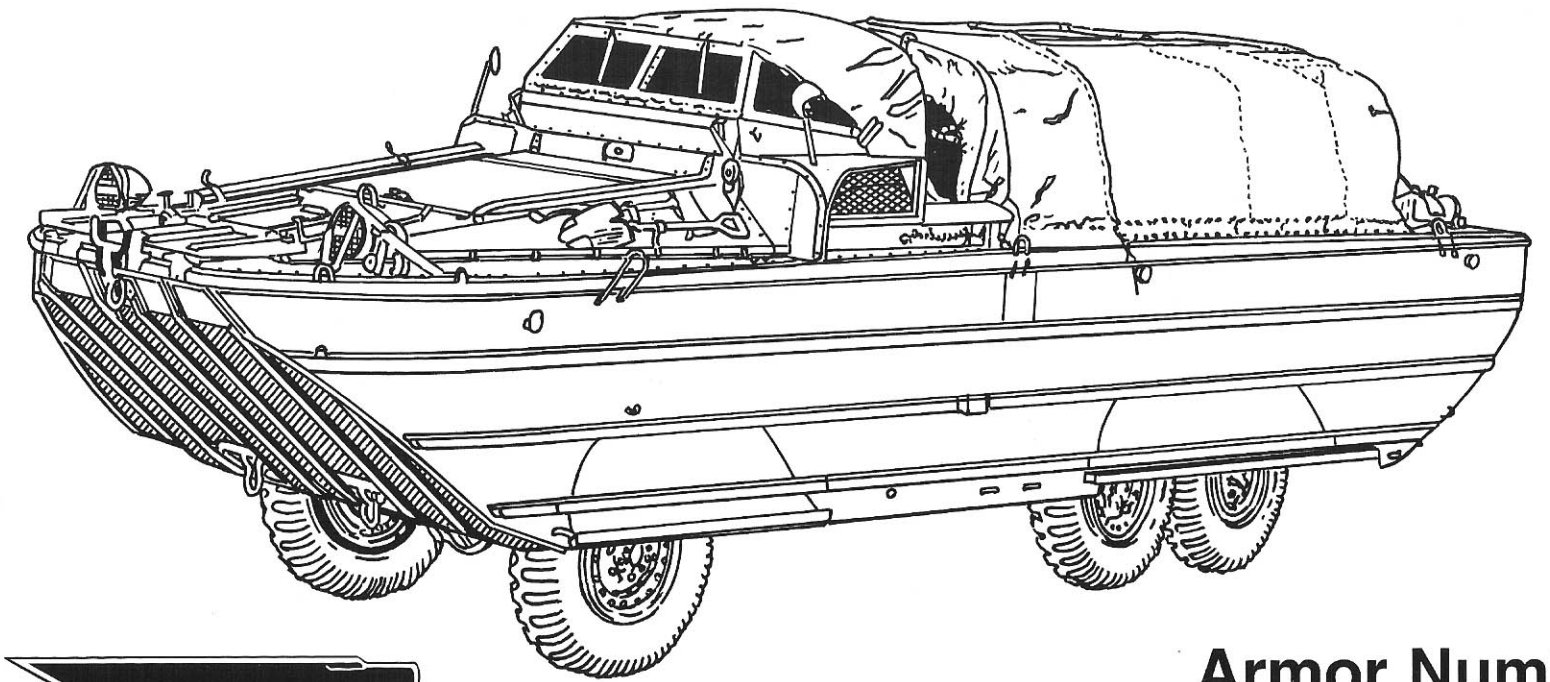
DUKW in action

By Timothy J. Kutta
Color by Don Greer
Illustrated by Perry Manley



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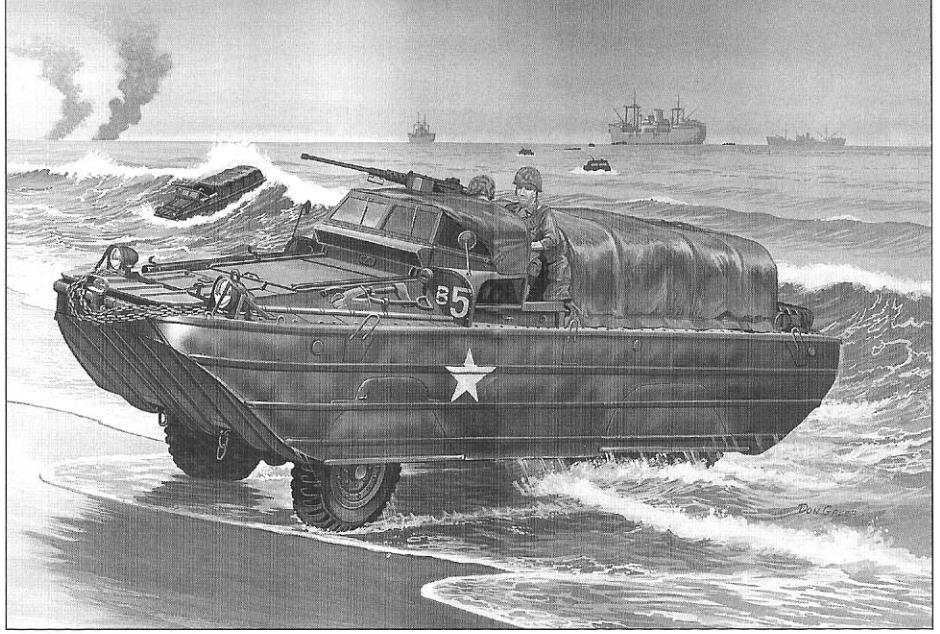

"Somewhere in the Pacific" **a Marine DUKW brings supplies ashore during the early spring of 1945.**

Acknowledgements

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A special thanks to Susan, Timmy, and Karen for learning all about DUKWs

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Dedication:

Dedication: To the men who crewed and serviced the DUKWs.

(Right) Looking like water bugs, one DUKW after another loads up and heads for the beach with needed supplies. Landing Craft Mechanized (LCMs) are also being loaded, and while the LCMs can carry far more, the DUKWs can drive right up to a supply dump, off-load their cargo and return very quickly for another load.

Introduction

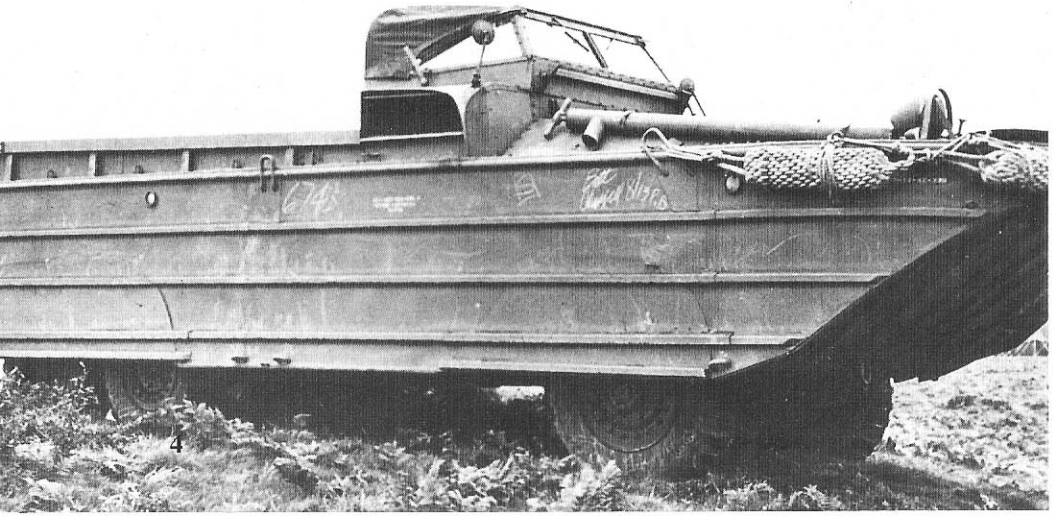
The DUKW was an amphibious version of the General Motors Corporation 2 1/2 ton cargo truck. It was developed for the United States Army during the Second World War to deliver cargo from ships at sea directly to the shore.

The United States government realized, even before the Second World War began, that they would soon be an active participant. As the U.S. geared for war, planners and military leaders met to discuss the direction and course of American involvement. The German blitzkrieg of Poland, Denmark, Norway, the Low Countries, France and the air attack on Britain demonstrated that the allies would have to conduct an amphibious invasion of Europe from England or possibly even America. In order to conduct an amphibious assault, the American military would need thousands of landing craft and hundreds of cargo and transport ships. Combat Arms Officers worked on the structure of an amphibious assault force while Logistics Officers worked on supporting an invasion.

Thousands of tons of ammunition, food, water and other war materiel could be delivered to the invasion area by the fleet of new Liberty ships which were then under construction. Moving these supplies from cargo ships to shore could be accomplished by a small armada of landing craft, which were also under construction. These tiny craft would carry the necessary items of war to the beach where they would be off-loaded to await movement inland. The system was effective during map exercises, however, the planners quickly found a need to deliver high priority cargo such as ammunition and water directly to troops fighting inland off the invasion beaches. Since no such vehicle existed in the military inventory one would have to be developed and built.

These amphibious vehicles would be used by several branches of the military. In order to simplify development and ensure a nonpartisan approach, the government assigned the task of developing this new type of vehicle to the National Defense Research Committee (NDRC). The NDRC was composed of engineers, designers, technicians and successful entrepreneurs. The men on this committee were given a charter to design the necessary weapons and vehicles

The DUKW could pull a 60% grade and clear an eighteen inch obstacle on the ground.



Anticipating inclement weather the DUKW was equipped with a canvas cover which stretched over the cab and cargo bed.

needed to further the war effort. In order to ensure their success they were given sufficient funds and backing at the highest level. Their first assigned project was the development of an amphibious version of the jeep.

Within a few weeks of receiving the order, P.C. Putman, the project chairman gathered his team. He contacted Roderic Stephens Jr., a naval architect of Sparkman and Stephens Inc., and asked him to design the hull. Next, he contacted C.L. Kramer and F.G. Kerby of the Ford Motor Company and asked them to design the engine and drive train and to determine if Ford Motor could mass produce the new vehicle which was now on the drawing board.

The vehicle which finally emerged was the Ford GPA or "Seep" as it became known. It went into production, but was never a great success nor greatly appreciated by the troops who were required to use it. However, the Office of Scientific Research and Development (OSRD), as the NDRC became officially known, had proven that it could develop a vehicle to meet the peculiar and unorthodox needs of a growing military.

In early 1942, with the invasion of North Africa looming on the horizon, Putman was put in charge of a team selected to design a larger amphibious vehicle. This vehicle would move supplies directly from the ship to shore. However, this project had a much more specific design criteria. The amphibious truck would have to have the same performance on land as other trucks of its type and size. In addition it would have sufficient sea going capabilities to handle rough sea swells, rough surf and be able to drive over obstacles such as reefs and sandbars. The truck would have to be based on a type already in service and be as similar as possible to the land going version to ensure maximum standardization of parts and maintenance services. A very tall order.

Putman decided that the ideal truck to be converted to an amphibious truck was the General Motors Corporation's (GMC) CCKW (C-designed in 1941,C-standard cab, K-front wheel drive, W-rear wheel drive) 353 series 2 1/2 ton truck. This was the standard medium truck used by the American military. After deciding on the type of truck Putman assembled his team at the beginning of 1942. He, again, assigned the design of the hull to Roderic Stephens Jr. and called on General Motors to provide the engine and drive train.

The project was greatly simplified by the use of the GMC CCKW 353 2 1/2 ton truck since it was already in production. Although it required a number of modifications to fit the hull designed by Stephens most of the components were already available and had proven reliability during operations. Preliminary design drawings were prepared in record time. Vannevar Busch, the head of the OSRD was so impressed with the preliminary work that he wanted four prototypes built. This new and unusual vehicle was viewed with quite a bit of skepticism by a

number of Army Generals, but an initial order for one vehicle was authorized on 15 April 1942.

A team of four specially selected Pontiac plant engineers were assigned to build the prototype and began work on 30 April 1942. Led by C.O. Bail, E. Allen, M.F. Klein and E.D. Todd, the team worked together smoothly and 43 days later rolled out the prototype which was delivered it to Fort Belvior, Maryland for testing.

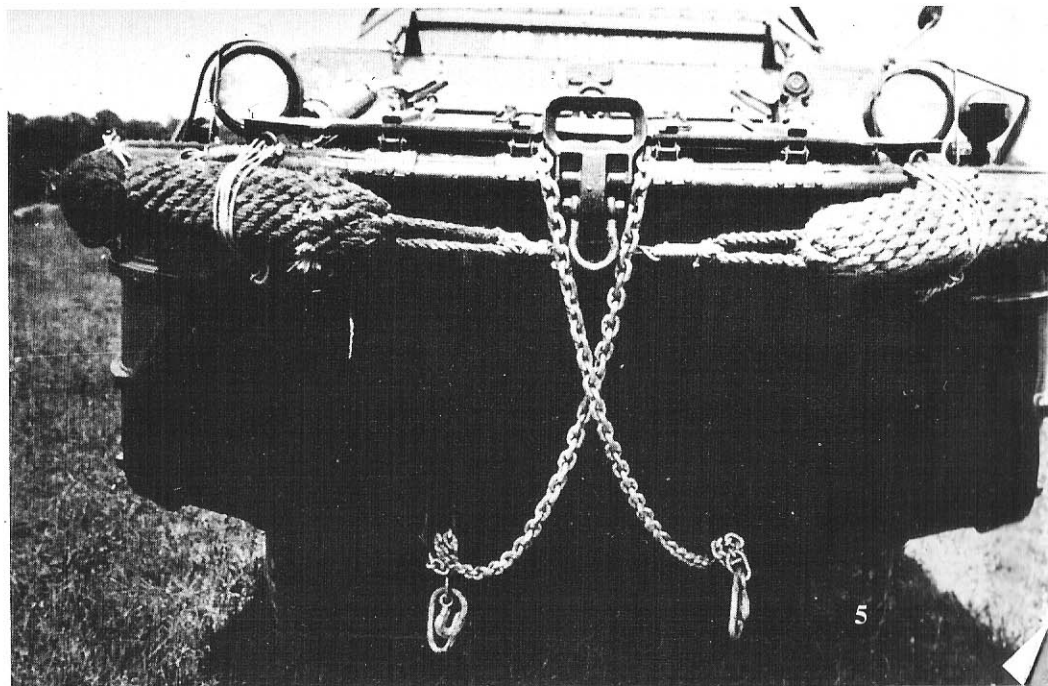
Between 12 and 26 June the prototype was subjected to surf tests in the Chesapeake Bay and Atlantic Ocean, off-road tests at Ft. Belvior and loading capabilities tests at Ft. Eustis, Va. The prototype performed admirably and passed each and every test with flying colors. As a result of these successful tests an order for 2,000 of the DUKW 353 series was placed (D-built in 1942, U-amphibious 2 1/2 ton truck, K-front wheel drive, W-rear wheel drive).

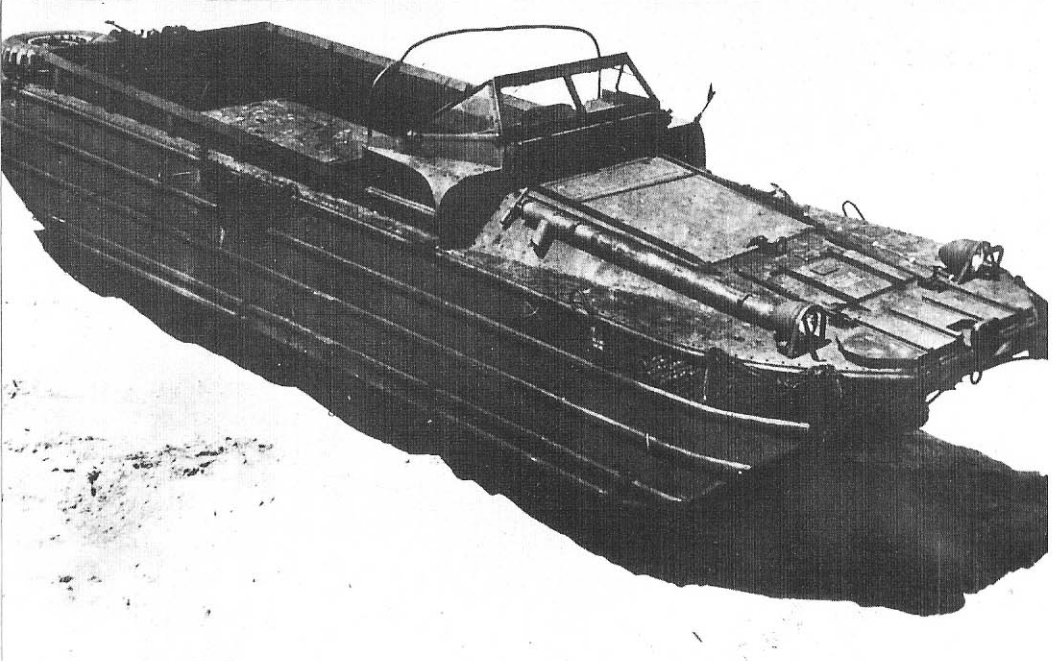
The production version of the DUKW 353, an amphibious six wheel drive truck with a steel hull, was 31 feet long, 8 feet 2.9 inches wide, 8 feet 9.5 inches high and weighed 19,570-lbs. It was powered by a GMC 270 cubic inch displacement, 6 cylinder in-line gasoline engine which developed 91.5-hp at 2,750 rpms. This engine gave the DUKW 353 a maximum speed of 45 mph on land and 6.3 mph in the water.

The DUKW moved forward in water using a propeller driven by a transfer case mounted in the drive line behind the transmission. In water, steering was accomplished by the front wheels and a specially constructed rudder which was interconnected to the steering gear. The entire DUKW was surrounded by a welded steel hull with a covered deck forward of the driver's compartment and another to the rear of the cargo compartment. It was equipped with a hull pump that could move 260 gallons of water a minute and a hand pump that could move 50 gallons a minute. It had a freeboard of 24 inches in front and had a loaded draft of 51 inches from the deck to the bottom of the tires. The DUKW could climb a 60% grade and broach an 18 inch high obstacle. It had a range of 220 miles on land and 50 miles in the water. It could carry 5,350 lbs of cargo, 25 fully equipped troops or six litter cases.

Learning to drive the DUKW and navigate in open water was considerably more difficult than was first anticipated. These new drivers learn the art of driving a DUKW under the watchful eye instructor.

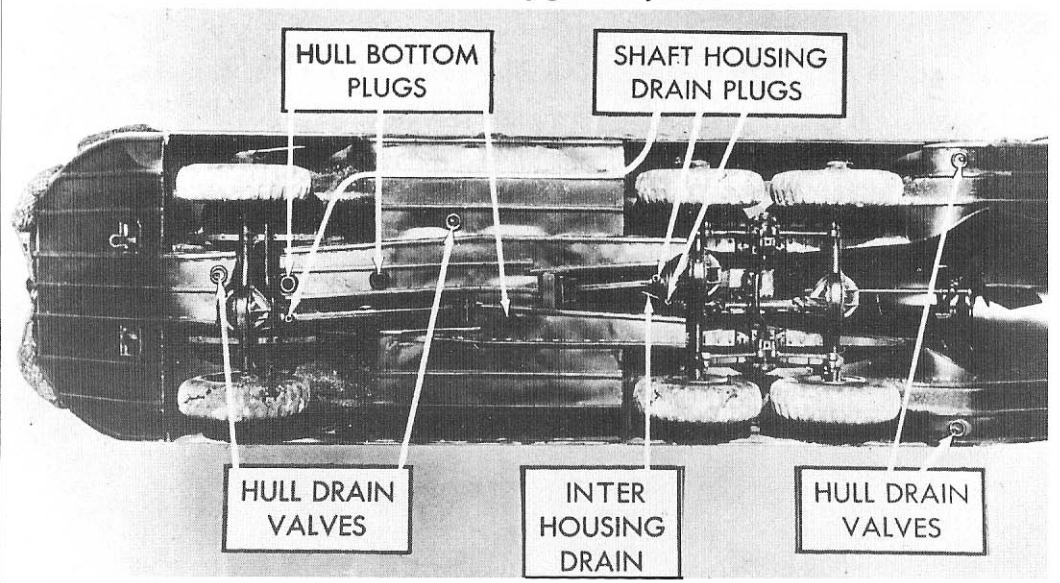
The front view of an early DUKW showing its bumpers, tow chains and towing clevises. The headlights have protective metal shields around them.

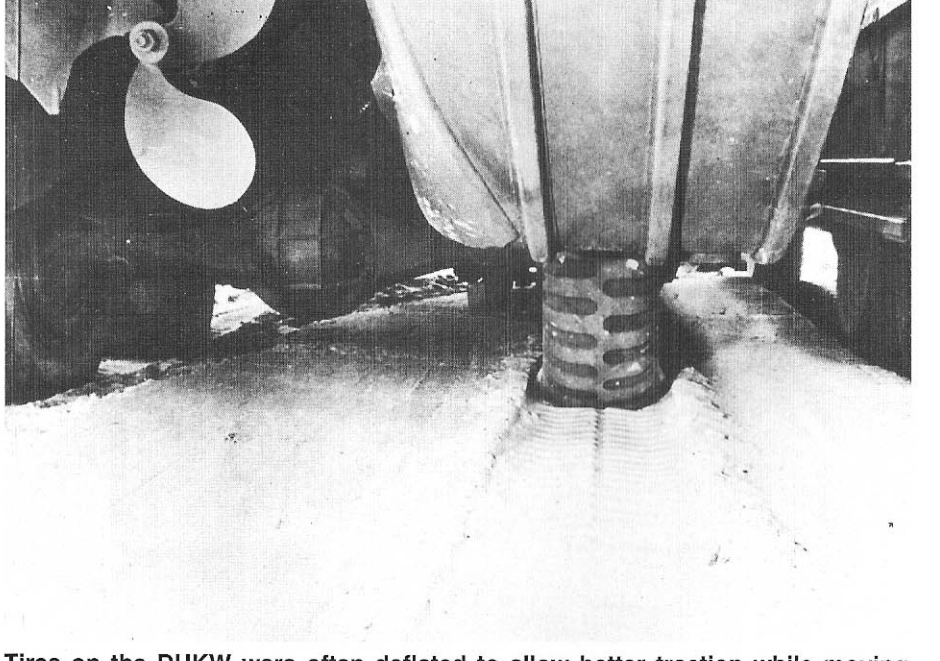




The long pipe like object with a handle at one end is the hand operated bilge pump capable of pumping 50 gallons of water a minute.

Instead of using either the hull pump or the hand pump the underside of the DUKW chassis had a large number of drains which the crew could use to drain water out of their DUKW once they got to dry land.





Tires on the DUKW were often deflated to allow better traction while moving through soft beach sand. The DUKW was equipped with a unique Central Tire Pressure Control which allowed drivers to increase or decrease tire pressure from the cab.

There were some last minute problems before procuction got underway. Both the DUKW and landing craft rolling off GM's production line used many of the same gears for steering and navigation and there were not enough to go around. Production difficulties were finally worked out and both assembly lines were soon operating at full speed.

While General Motors began series production of the DUKW 353, the military created the organization that would take the DUKW to war. The Navy, responsible for the operation of all boats and ships, simply could not train enough boatmen to operate all the numerous landing craft rolling off the assembly line. The addition of the DUKWs aggravated an already difficult situation even more. In early 1942 the Navy suggested that the Army train and man some of the landing craft that carried troops from ship to shore, and man all of the DUKWs.

The Army was excited about the prospect and initially assigned the mission to their Corps of Engineers and later to the Transportation Corps. At first the Army thought it would be a simple matter of putting the selected men through a short two or three week course. But the officer in charge of training, Colonel Daniel Noce, quickly found that personnel who operated the DUKW required more highly specialized skills and training than was originally anticipated. In addition to operating the vehicles, the men had to learn navigation, Army and Navy signals, the use of infra-red and ultra-violet devices for night operations and landings.

Colonel Noce correctly pointed out that using normal combat engineers to man the DUKWs would be inefficient since the combat engineers would be needed on the beach during landing operations while the engineers driving the DUKWs would be involved in the landing. Moving men between two types of jobs would only reduce the specialized skills needed for each job. Colonel Noce argued that the engineers needed to create a specialized Engineer Amphibian Command would provide trained boatmen for the landing craft and DUKWs.

The Army recognized the wisdom of Colonel Noce's argument and established the Engineer

The DUKW was such an unusual piece of equipment that a cut-away version was built to show the crews and mechanics the internal components, how it stayed afloat, and how it was propelled through the water.

Amphibian Command early in the summer of 1942. Initially, the new command had a strength of 18 engineer regiments (boat operating) and 7 maintenance battalions. They were ordered to begin training with a nearby infantry division by 15 July 1942. Along with the new command the Commanding General of Supply was directed to establish a boat training center at Camp Edwards, Massachusetts on 9 May 1942.

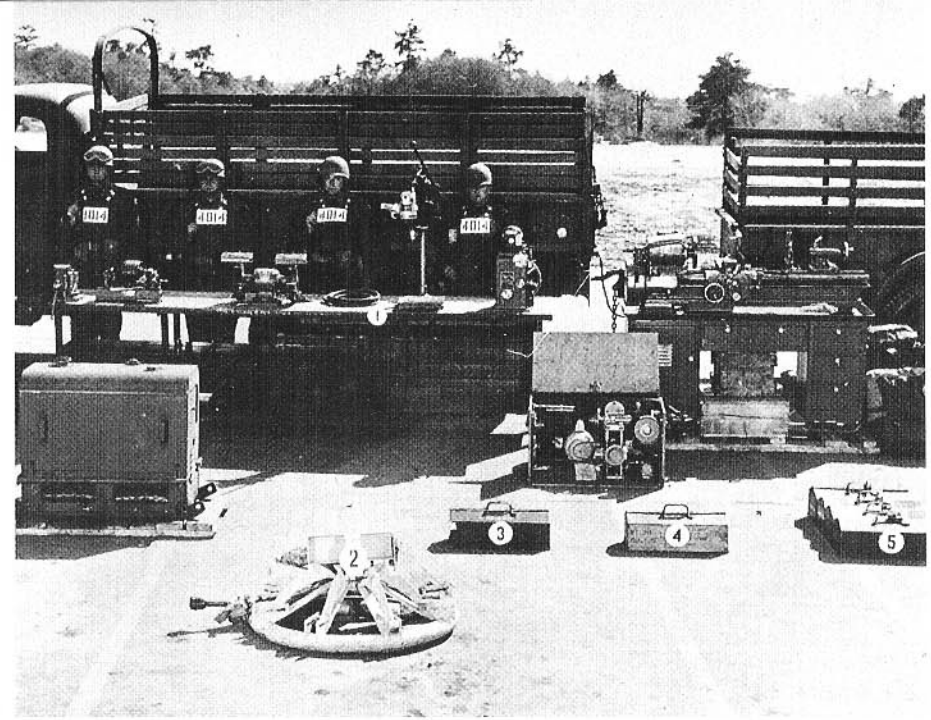
With little time to train and no doctrine to follow the Engineer Amphibian Command was forced to recruit men, receive new equipment and develop a training syllabus using unorthodox methods. The staff at Camp Edwards, which became the command's home on 10 June 1942, selected men from the 37th Engineer Combat Regiment, the 87th Engineer Battalion and six Quartermaster and Ordnance units. However, these units could not provide enough engineers to fill the ranks, so the staff also recruited men from the Navy and Coast Guard.

Direct Commissions were offered to 400 men with experience in handling boats and surf operations. Boat maintenance courses were taught by local civilian boat and yacht companies and equipment was selected after having been proven under civilian conditions. The 1st Brigade was formed on 15 June with a Table of Organization of 349 officers, 20 warrant officers and 6,266 enlisted. The new command grew quickly with the 2nd Brigade forming at the end of June and the 3rd Brigade in early August. With the tremendous growth the strength of the new Command rose to 2,899 officers and 37,651 enlisted men by the end of December.

While the new command was being put together, tests were being conducted on the first DUKWs off the assembly line. The head of the new equipment development board for the Engineer Amphibian Command, Colonel W.D. Luplow, carried out extensive tests at Cape Cod and later at Fort Ord, California on the abilities and capabilities of the DUKWs. These tests led to several suggested modifications which were quickly incorporated into the next production batch of DUKWs.

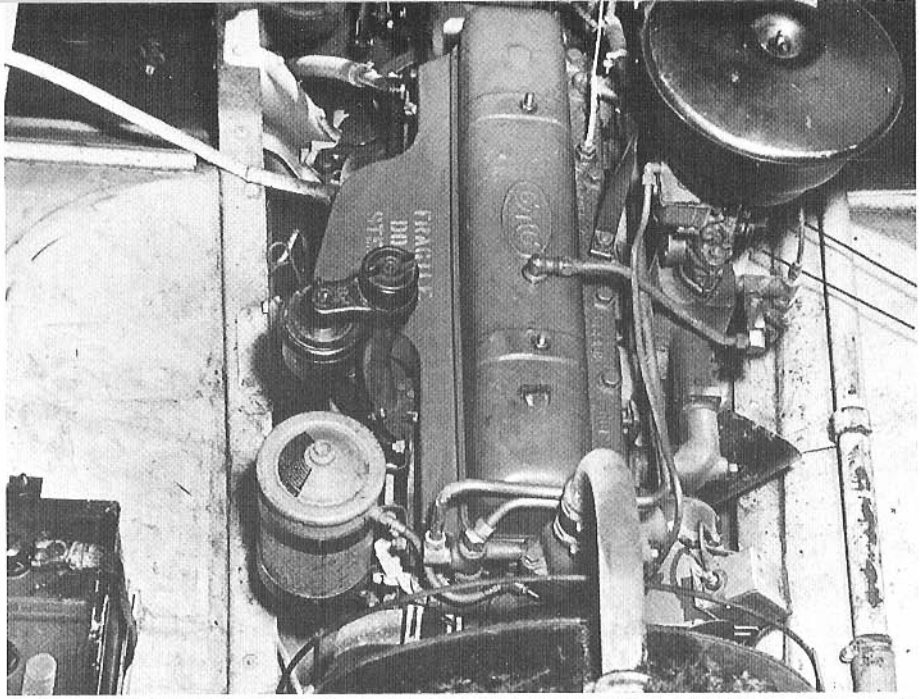
The cargo compartment of the DUKW with the flooring/access panels removed exposing the inner workings of the vehicle. The drive shaft to the propeller runs almost the entire length of the vehicle under the cargo compartment.

A DUKW, its crew, its support personnel, and the equipment necessary to keep it operational.

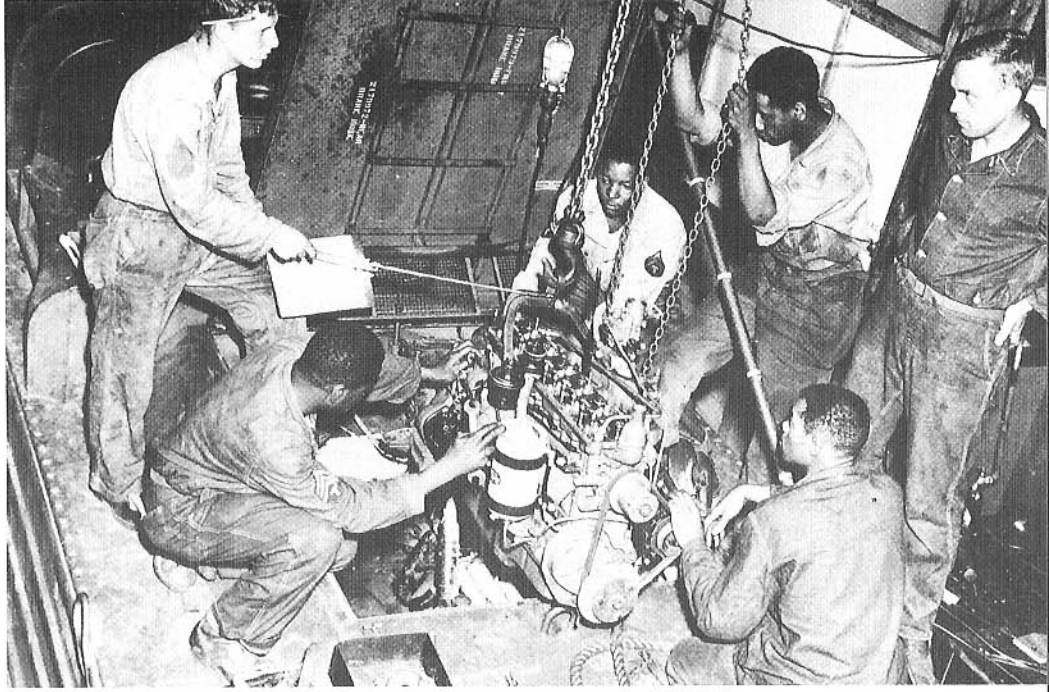


A DUKW maintenance support team with a land bound truck and trailer. These teams were assigned to DUKW companies, carried a plethora of maintenance equipment including work tables, a generator and a lathe.

An early rounded hull DUKW (7032555) loaded with its three man crew and a full complement of equipment is ready for inspection.

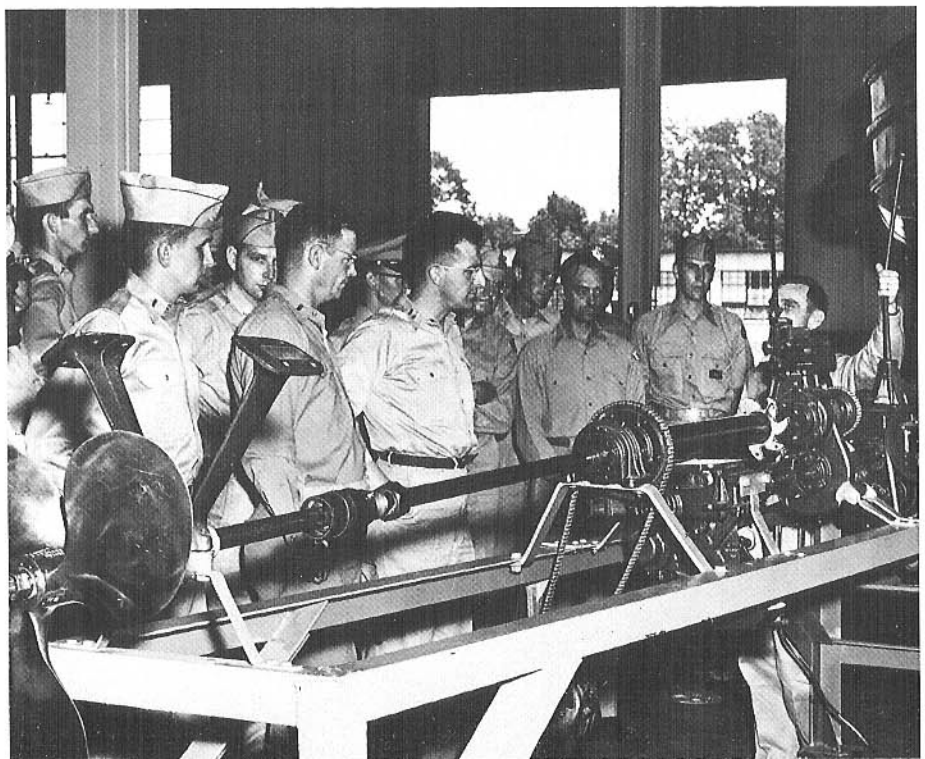


A GMC 270 cubic inch displacement engine, turning out 91.5-hp at 2750 rpms was the standard power plant of the DUKW.

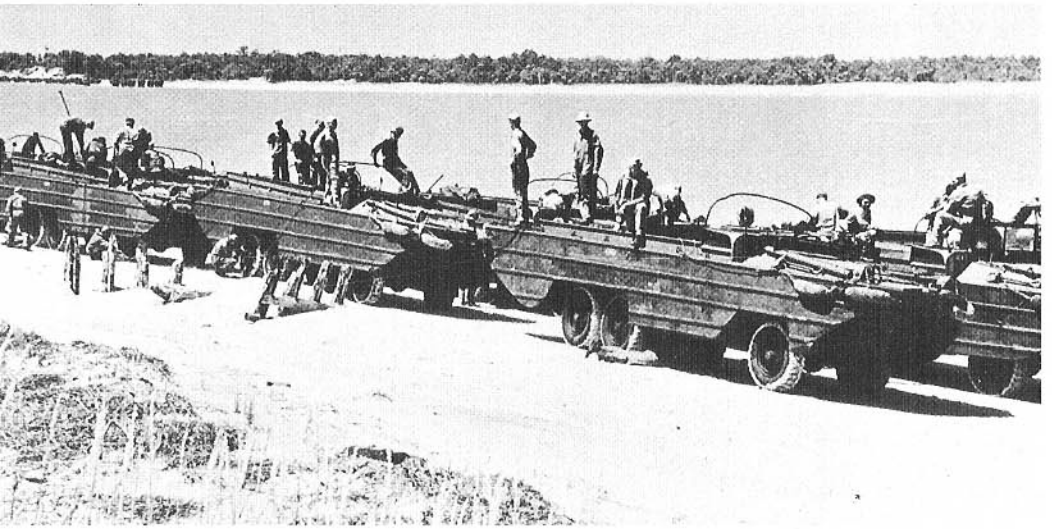


These students pull the 6 cylinder in-line motor out of a DUKW.

Maintenance training was stressed especially the care of the drive shaft and their vulnerable universal joints, which had to be greased regularly and often.

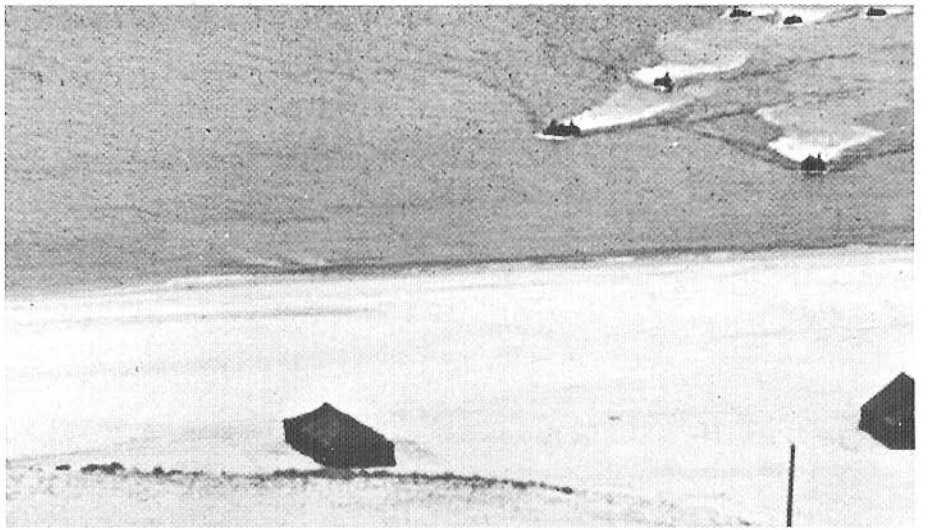


Student mechanics learn the art of changing a tire on a DUKW from an experienced instructor.



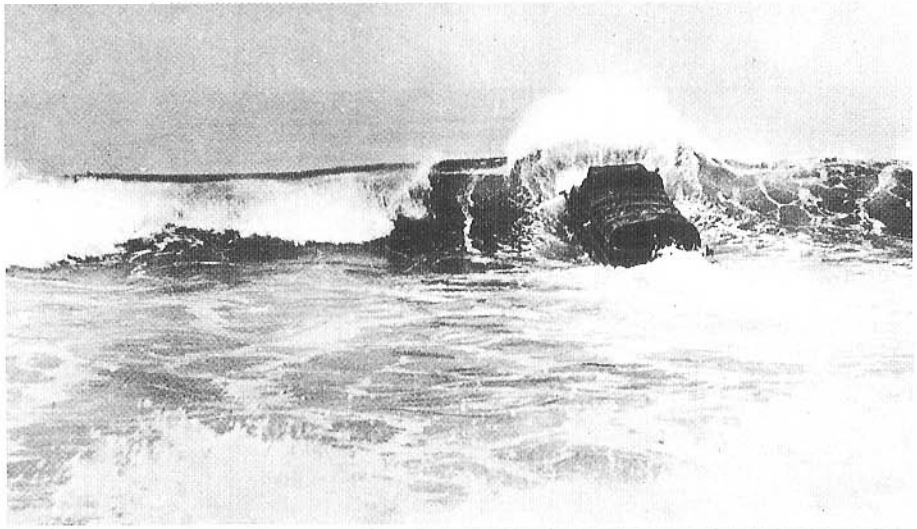
Because of its ocean going role DUKWs required extensive regular maintenance. Constant exposure to salt water, sand, wind, and salt air, took a heavy toll on the moving parts of the vehicle.

Crewmen also spent a great deal of time checking tires which were easily cut up by sharp coral, rocks or other underwater objects, either natural or man made.



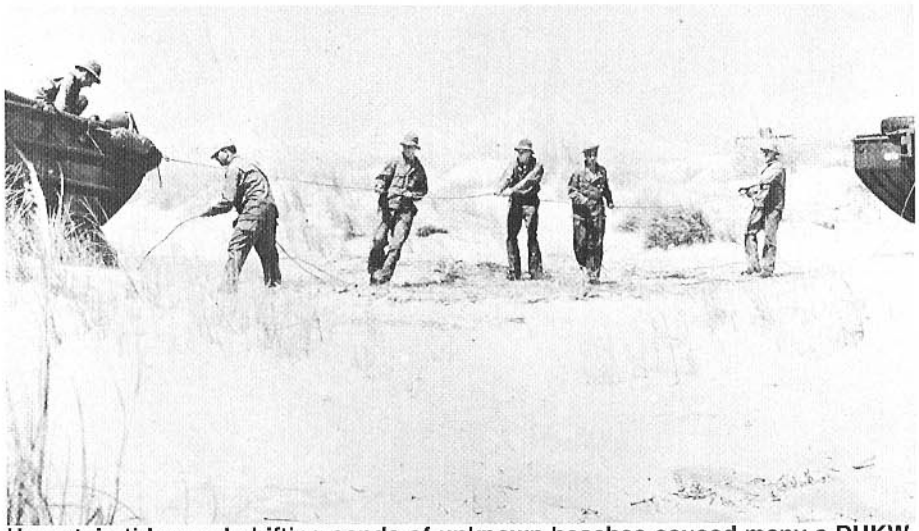
Drivers learned to operate in formations. A phalanx of three DUKWs nears the beach followed closely by more DUKWs from the same unit.

Exiting the water onto the beach was an important lesson. Riptides could quickly take the unwary driver from his destination or swamp the vehicle. These DUKWs learn to angle onto the beach while maintaining their formation.



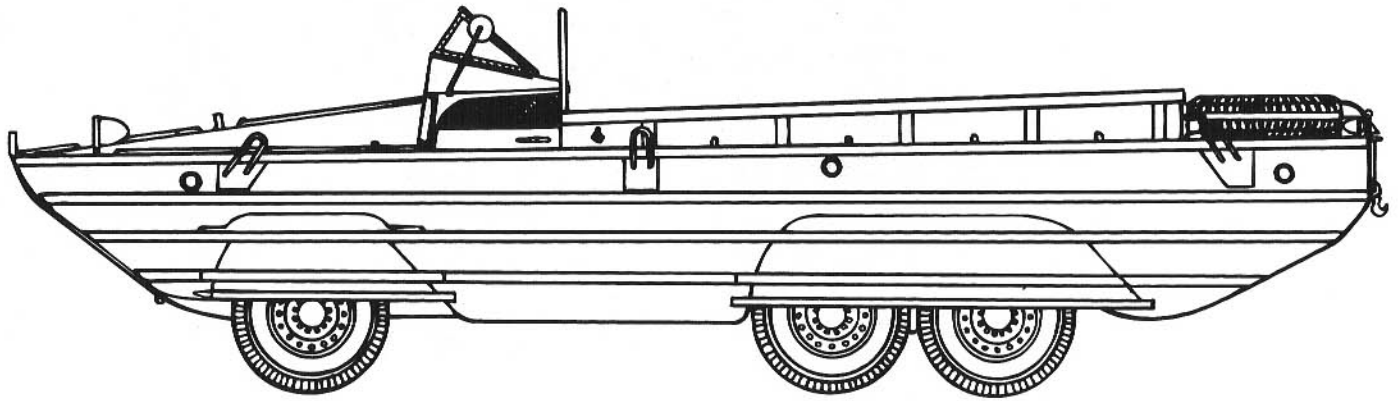
DUKWs were extremely seaworthy. This DUKW fights its way out to sea through heavy breakers.

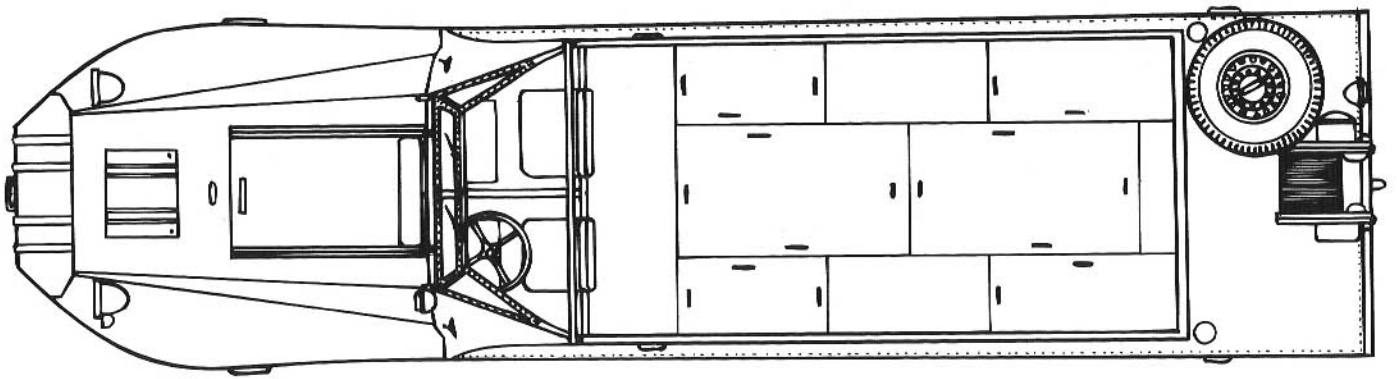
Heading out to sea through heavy surf, the farthest DUKW has deployed its Windshield Surf Board to avoid taking water over the bow into the driver's compartment. Waves like this were sufficient to swamp a DUKW with an inexperienced driver at the wheel.



Uncertain tides and shifting sands of unknown beaches caused many a DUKW to bog down. As a matter of necessity, the crews became experts at towing.

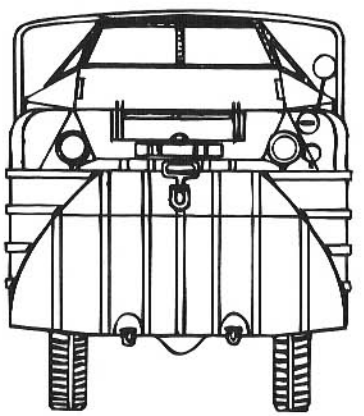
Two DUKWs with their wheel well spats removed sit on the beach. A tow line is stretched tightly between the vehicles. Both are early production DUKWs with rounded noses.

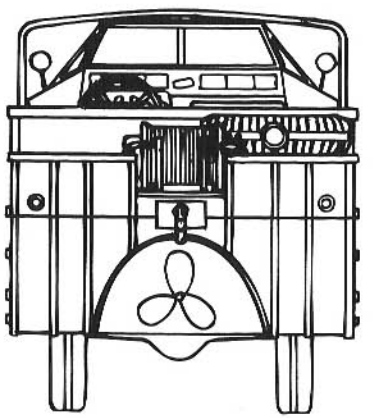




DUKW 353 Specifications

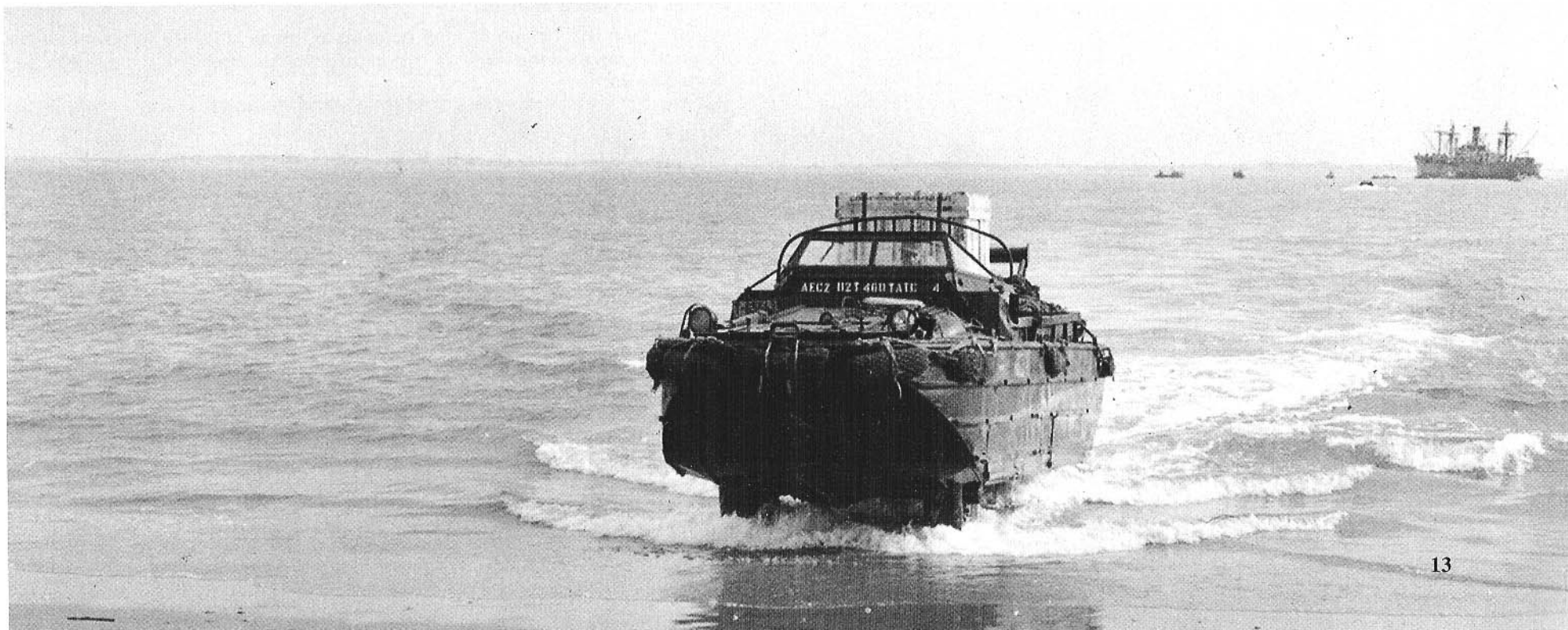
Length	31 feet
Width	8 feet 2.4 inches
Height	8 feet 9.5 inches
Weight	19,570 pounds
Engine	91.5-hp GMC 6 cylinder
Maximum Speed	
Land	45 mph
Water	6.3 mph

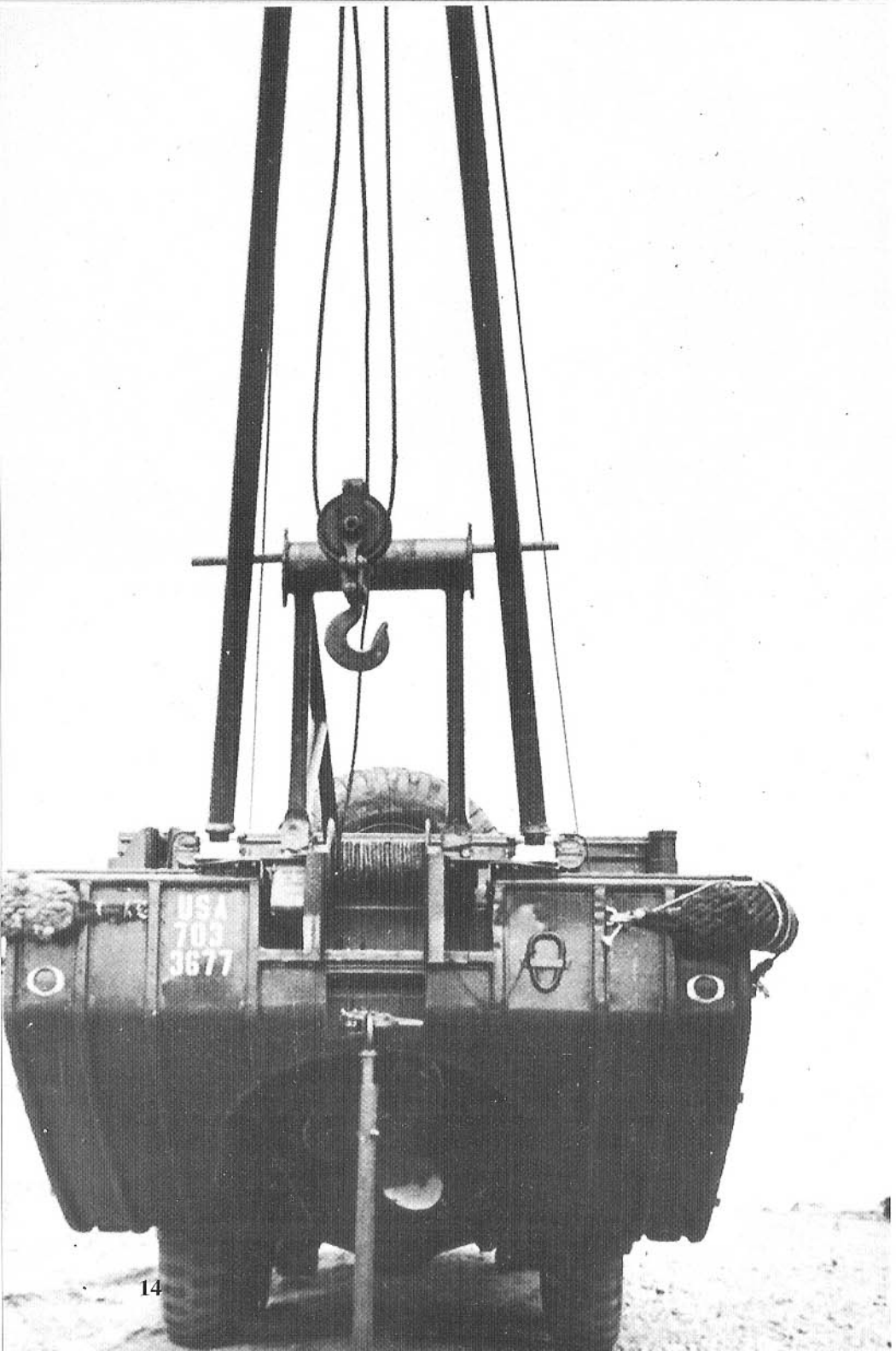


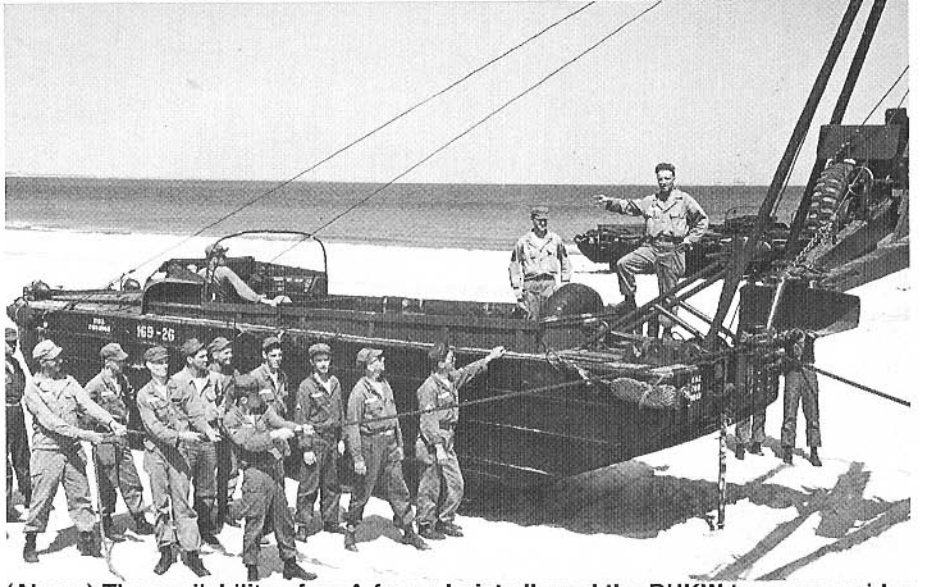


(Above) As soon as the Army realized that a DUKW could carry a 105mm howitzer, loading and unloading the gun was made part of the training course. Transporting a 105mm howitzer was no different from other cargo, however it took a hoist to unload it.

(Below) This DUKW, coming up a well used shore, carries a tall pallet of cargo — a number of DUKWs can be seen off loading a Cargo ship in the background.



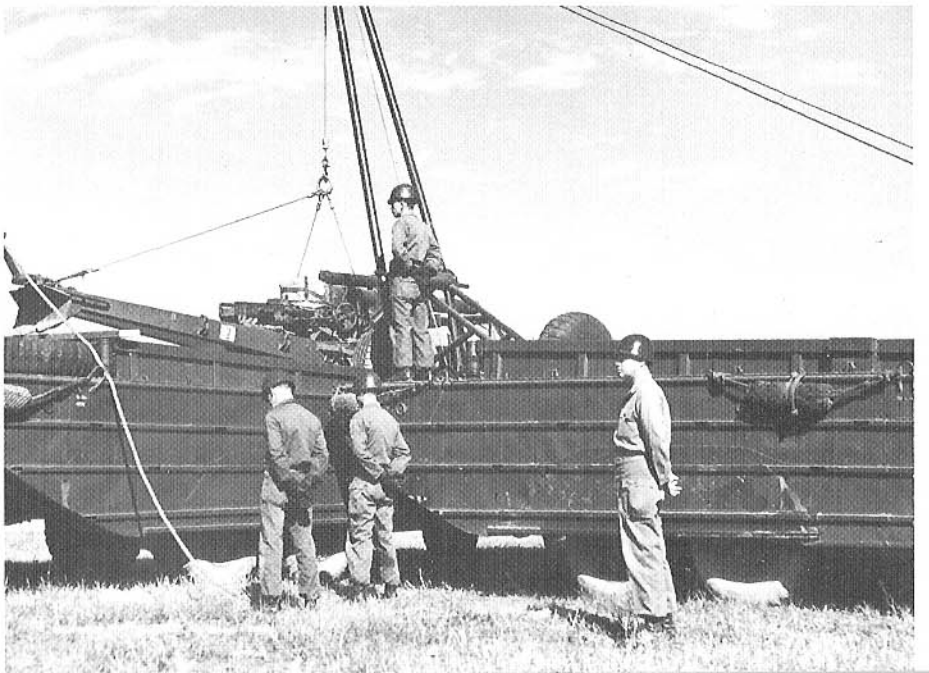


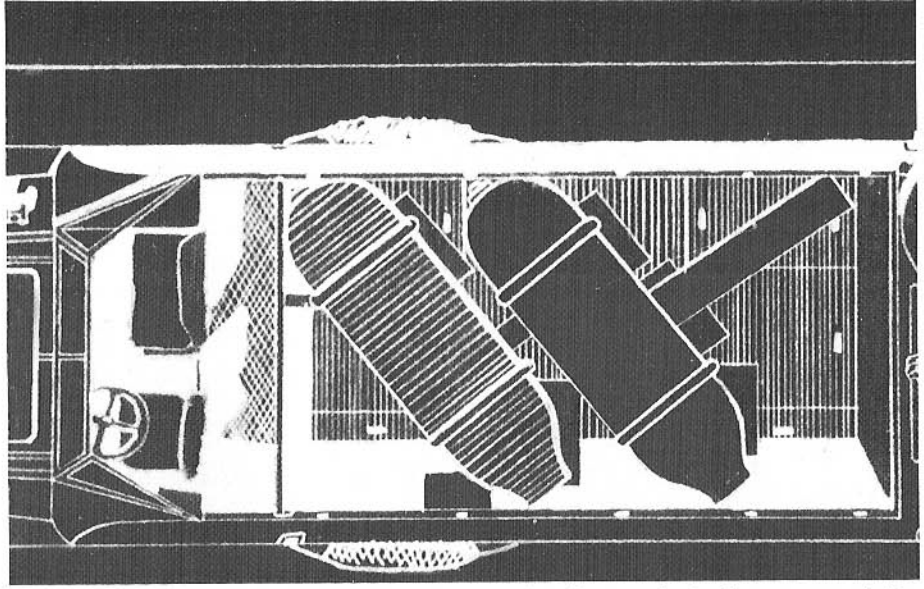


(Above) The availability of an A-frame hoist allowed the DUKW to carry a wider variety of cargo. Using a hoist, this 105mm howitzer is carefully lifted into the air.

(Left) In order to ease loading and off loading of heavy cargo, several DUKWs in each unit were fitted with A-frame hoists which utilized the vehicle's rear winch. The rear stabilizer bar was deployed to keep the DUKW from tipping over. The initial A-frames were constructed of wood in 1942, however, by 1943 the A-frames were made of metal.

(Below) With the 105mm cannon hanging in the air a DUKW is driven underneath the gun, then the howitzer is lowered into the cargo bed of the DUKW and lashed down.

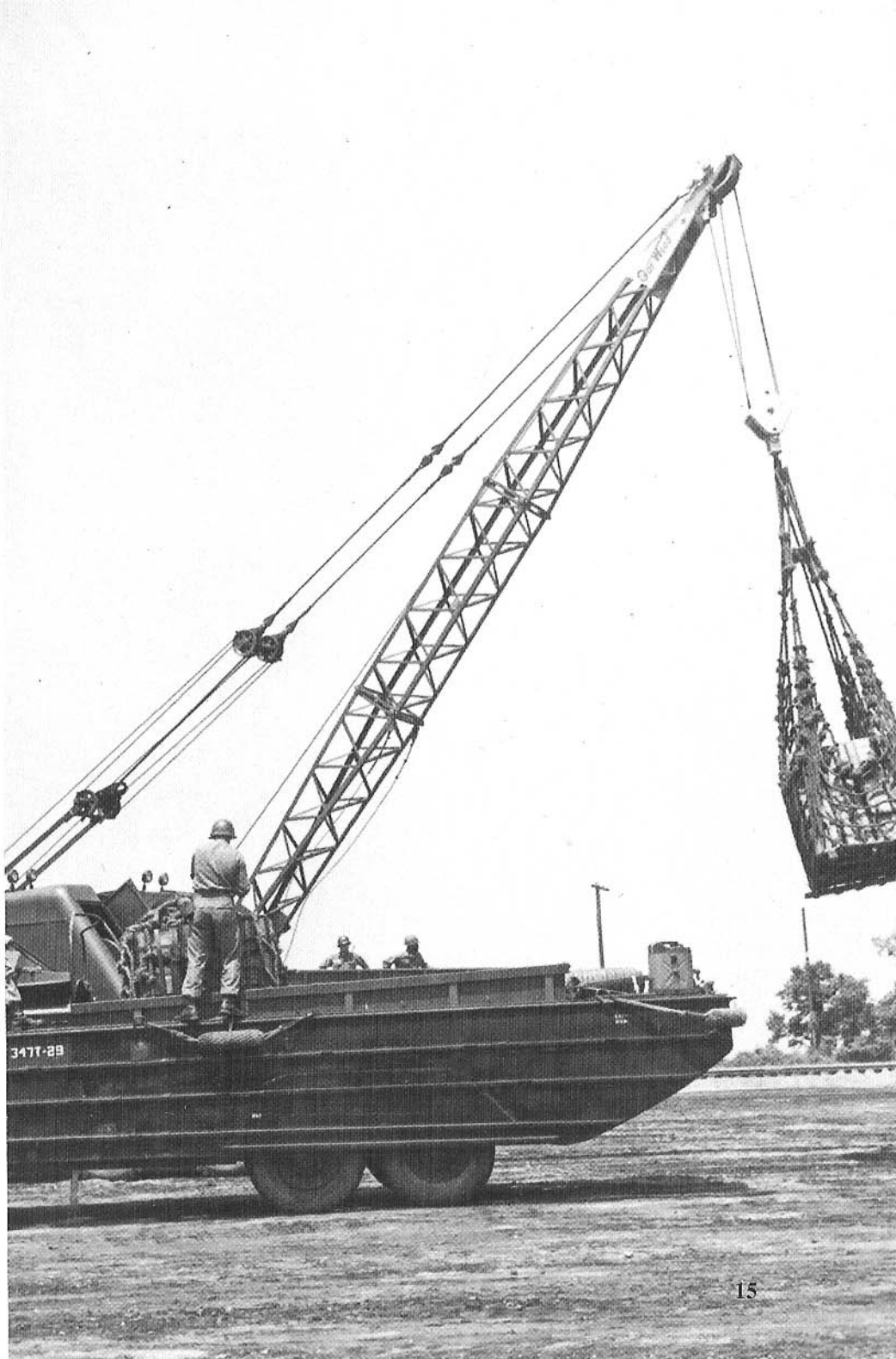


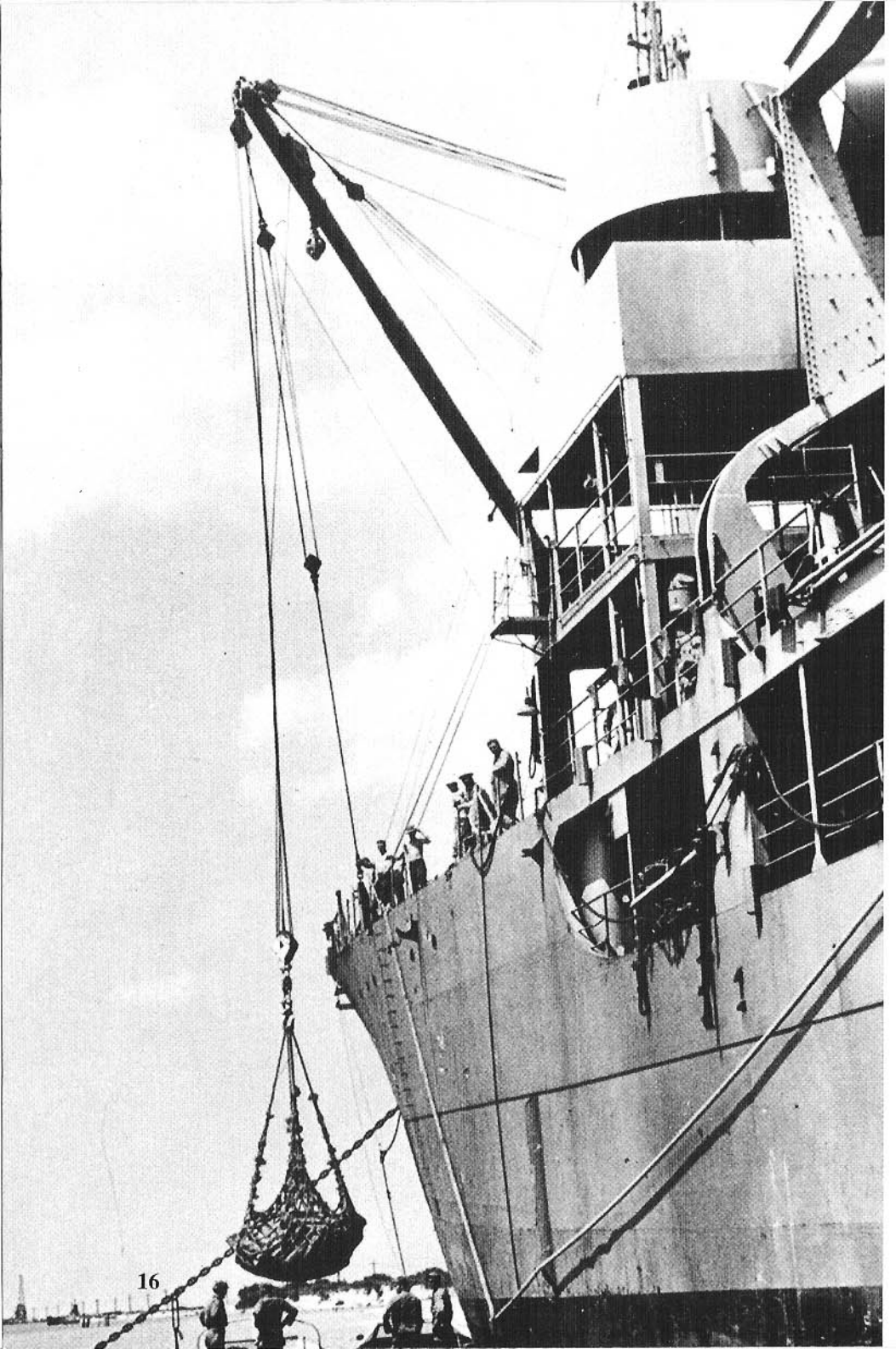


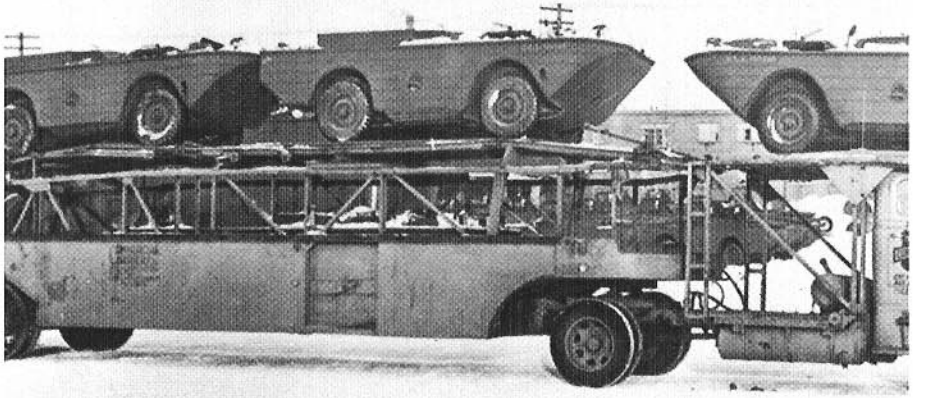
(Above) The DUKW carried various types of ordnance including some of the largest bombs in the U.S. inventory. Crews were taught how to load, brace, and lash down bombs in order to prevent accidents during movement.

(Right) DUKWs could carry a large variety of cargo and could receive cargo while on dry land or at sea. This DUKW receives bulk cargo in a net from a near-by crane.

(Below) Using a hoist this 4,000-lb bomb is being loaded into the bed of a DUKW. Such heavy loads required extensive dunnage to keep the bomb from crashing through the thin sides of the vehicle.



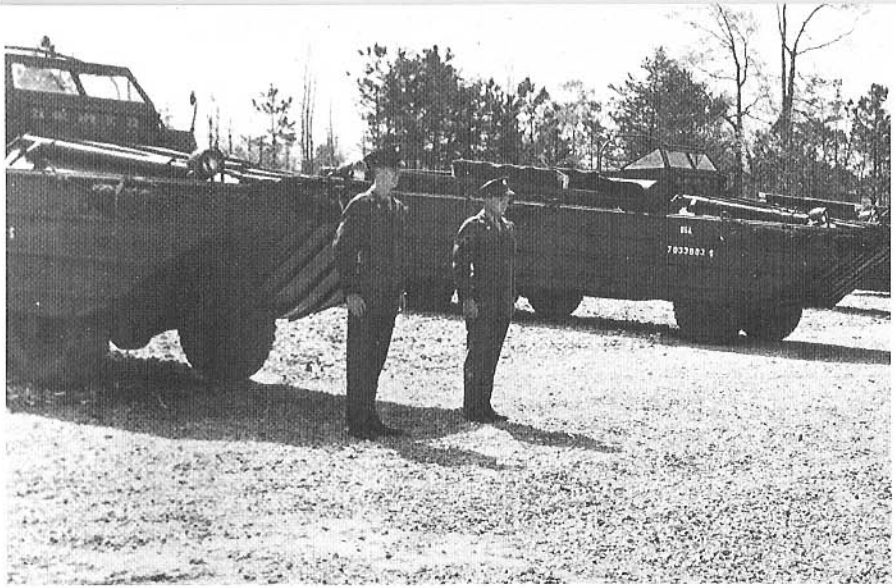




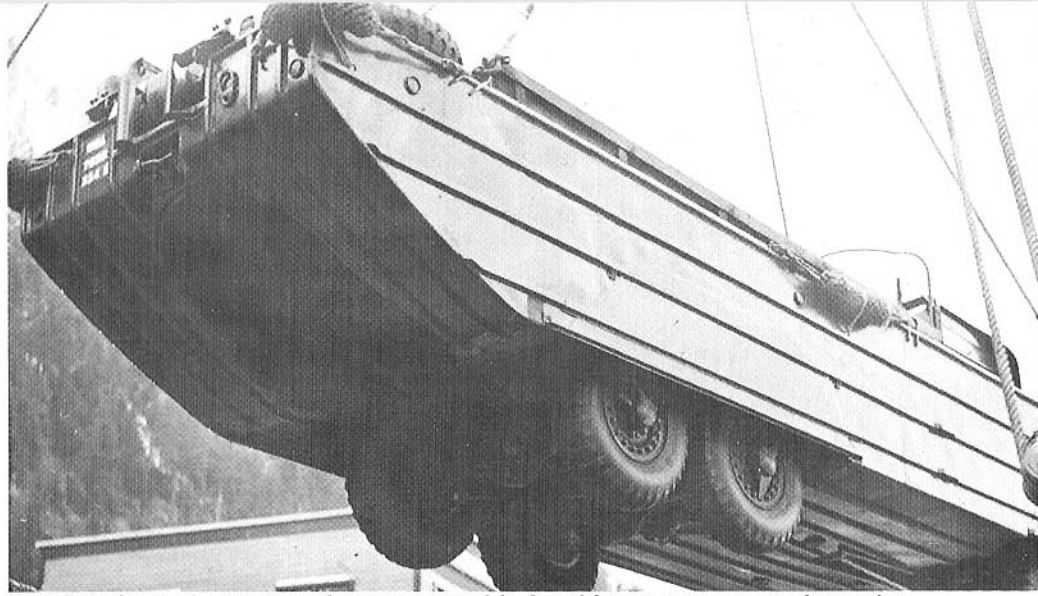
(Above) In order to provide commanders with sea going mobility without wasting a valuable DUKW, a smaller version of the DUKW, the SEEP was used. A truck load of SEEPs is being delivered for shipment to combat units going overseas.

(Left) Receiving cargo from the side of a ship could often be a tricky proposition especially if the water was rough.

(Below) Once cargo was ashore it had to be sent to the correct location for off loading. Tracking cargo began at the beach and continued at inland locations.

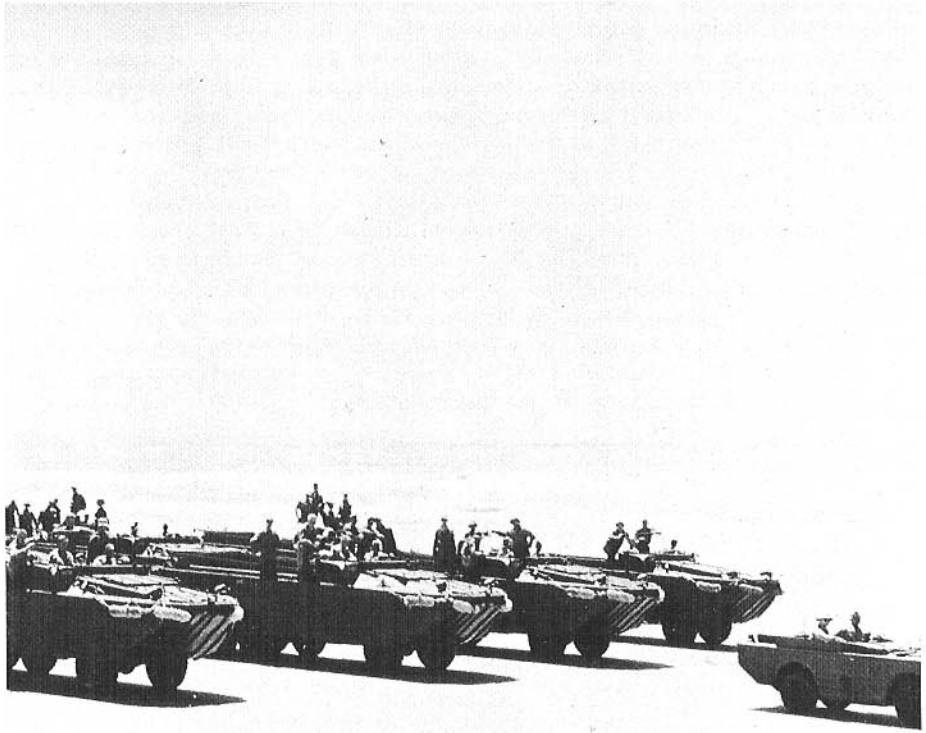


Having finished their training, crews stand ready for inspection in front of their DUKWs. The unit will be shipped overseas shortly.

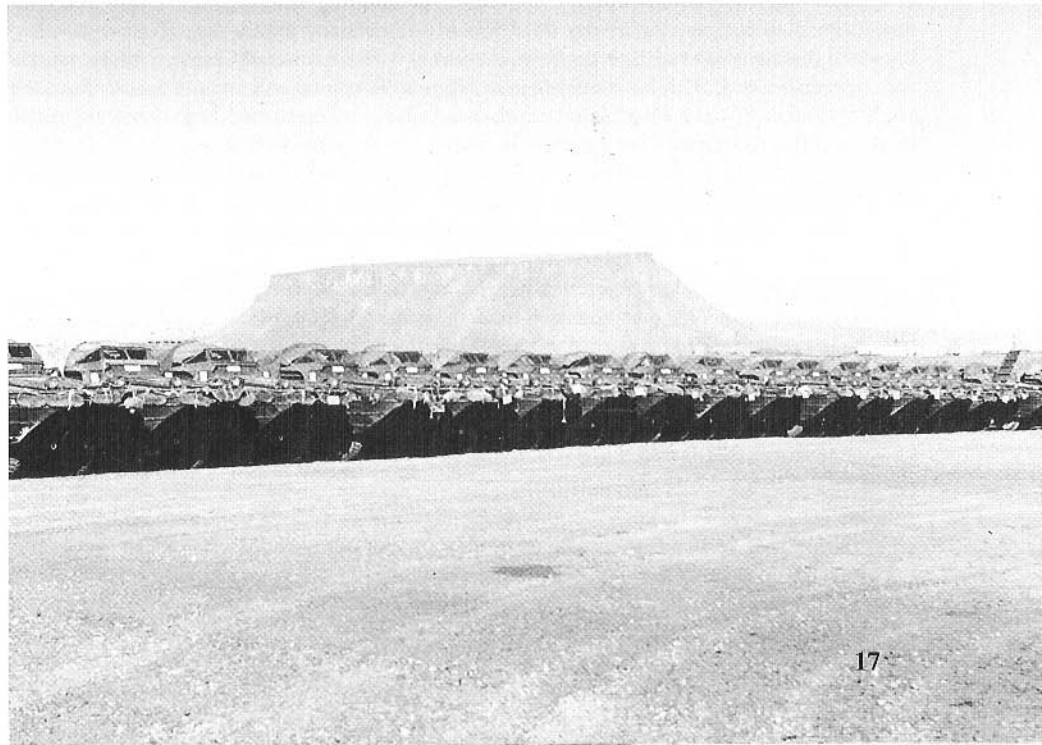


As it is being hoisted aboard a transport ship for shipment overseas, the underside of this DUKW can be seen.

A DUKW company in inspection formation. The Commanding Officer rides in front of the company in his SEEP.



DUKWs were shipped to nearly every theater of operations; this line up of DUKWs in Thule, Greenland awaits shipment to Europe.



To War

The 1st Brigade was sent overseas in August of 1942 while the 2nd Brigade was sent to Florida and then to Fort Ord, California. During the move to California General Douglas MacArthur requested a brigade of the new Amphibian Engineer Troops to support his operations in the southwestern Pacific. The 2nd Brigade was given a full complement of DUKWs and other craft and embarked for the Pacific in mid-January 1943.

The 2nd Brigade formed the first amphibian truck company, the 5204th (Provisional) in the southwest Pacific at Townsville, Australia in early 1943. The first operational use of the DUKW came in March of 1943 when the 2nd Brigade landed Army troops on Noumea. The landing was small and involved few landing craft and DUKWs. Nonetheless, the amphibian engineers had established their worth and quickly became an integral part of the Army's drive through the southwest Pacific.

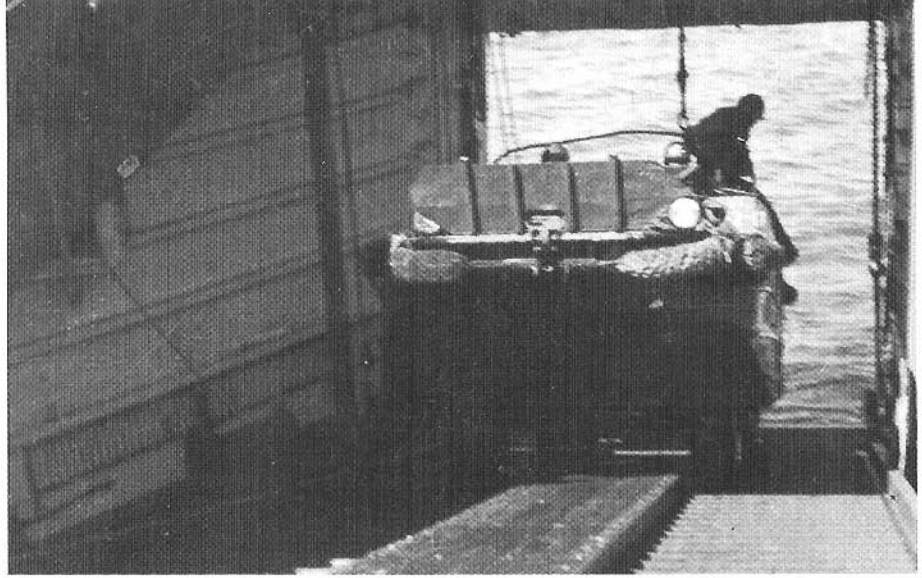
The DUKWs, which were organized into companies participated in the Salamaua operation and Lae campaign. During these campaigns DUKWs displayed their versatility by carrying artillery ammunition directly from anchored ships to shore. Although this mission was essential and the timely delivery of ammunition kept American casualties to a minimum, it was pretty routine stuff. Soon, however, American ingenuity took over and some of the DUKWs were modified to carry 4.5 inch rockets. The rocket-armed version was tested successfully during the landing at Arawe, New Britain on 15 December 1943. This new version allowed uninterrupted fire support to follow the assault waves right onto the beach.

The effectiveness of the rockets was increased because the engineers, in their initial recruiting, had taken soldiers from all the various military specialties including artillery. Each of the engineer units had men who were familiar with artillery and fire support operations and had little trouble adapting to the inclusion of the new weapon system into their units.

While the engineers developed their amphibious doctrine the Transportation Corps took control of the DUKWs. An amphibious truck was still a truck and the training of drivers, operations and maintenance was best centralized under the Transportation Corps. Initially, no one was sure how many DUKWs would be needed and the planners thought it best to form the DUKWs into independent amphibious truck companies and assign the companies as needed to Engineer Special Brigades for amphibious operations. If enough companies were deployed they would be assigned to a Quartermaster Battalion for command and control. Although the organization looked cumbersome on paper it was actually quite efficient. The Engineer Special Brigades ran the beaches during the initial assaults and the Quartermaster Battalion regulated the flow of supplies.

The Transportation Corps began training amphibious truck drivers and crewmen in January of 1943 at Fort Story, Virginia. The need for amphibious truck companies grew rapidly and the training site was moved to a larger facility at Charleston, South Carolina in March and later at Camp Gordon Johnson, Florida. The course of instruction was originally three weeks long but the instructors soon found that this was an insufficient amount of time to learn all the specialized skills required of crewmen operating the DUKW during an amphibious assault. The first two classes were given several weeks of additional training, but even after almost a month of further training the men were still ill prepared to operate the complex new vehicle under wartime conditions. Eventually, as the training regimen reached its maximum efficiency, the course length was standardized at five weeks.

There were other problems with the training program. The DUKWs had just gone into mass



In order to insure that its propeller is not damaged a DUKW drives very slowly and carefully up the bow ramp. An LST could carry 21 DUKWs. For some reason the surf plate is deployed.

production and few were available for training, many of the first vehicles off the assembly line were shipped directly overseas to operational units. The schools did not receive their full allocation of training vehicles until February 1944 and training suffered accordingly.

The Army also found that operating the DUKW was far more difficult than expected. The vehicle had been developed quickly and rushed into production. Inexperienced drivers were faced with vehicles which had many teething problems. Break-downs were common and lack of spare parts made repairs difficult and sometimes impossible.

Evaluation reports of the training program coming back from front line units indicated that many of the drivers who completed training in the calm waters off the coast of the United States were overwhelmed in rough surf during operational conditions. The first units sent overseas found that as many as 15% of their crews could not handle the DUKWs properly under combat conditions. These crews were reassigned, but their loss left the DUKW units undermanned. This initial experience led to better and more realistic training in the United States and by war's end less than 5% of the crews were found unfit when they faced combat operations.

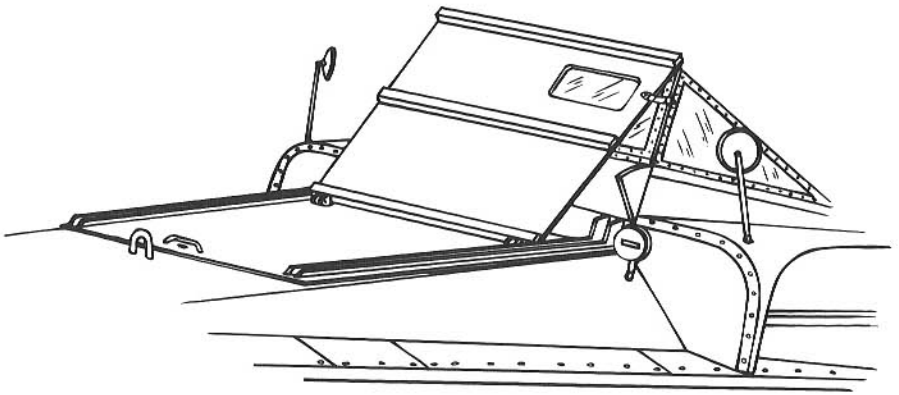
In addition to training the drivers the Army found it necessary to train the instructors of the DUKW school. Since the DUKW was a completely new item of equipment there were no experts in the field. Instructors and maintenance officers were sent to the General Motors Corporation's War Products School for a three week course beginning in October 1943. In addition 1,065 other instructors were sent to various civilian concerns to learn about marine diesel engines, harbor operations and unloading procedures.

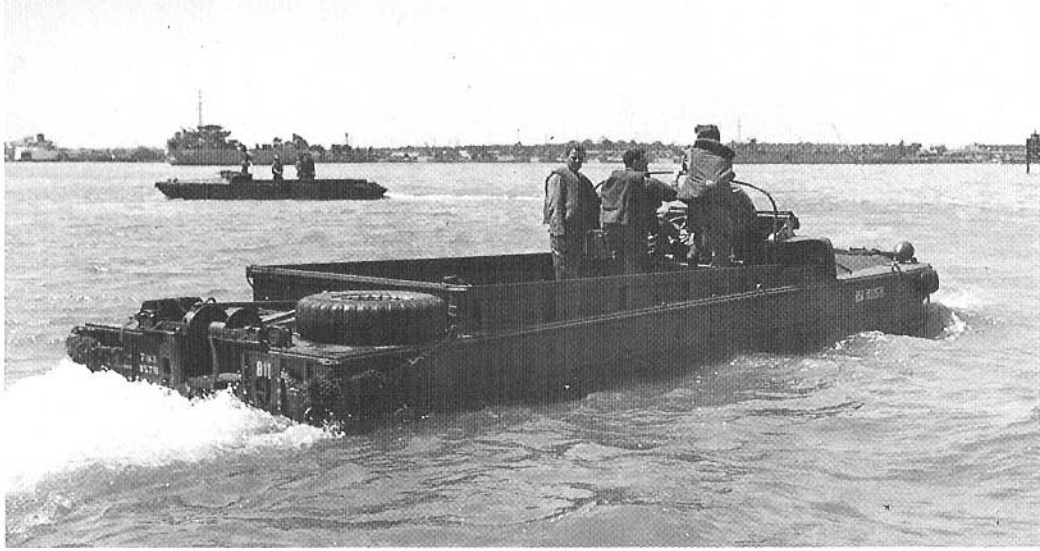
During the Second World War the United States Army activated 51 amphibious truck companies in the United States staffed with 316 officers and 9,028 enlisted. The Army also activated 19 amphibious truck companies overseas which were staffed by 118 officers and 3,367 enlisted. Based on these figures a standard DUKW company had an organizational strength of 6 officers and 177 enlisted.

Each of the companies was divided into a company headquarters, maintenance section and

Surf Plate

(In up position)





After delivering its cargo this DUKW is heading back out to the ship for another load. Navigating in crowded harbors could sometimes be a risky affair.

three operating DUKW platoons. Each platoon was equipped with 12 DUKWs which were organized into three operating sections. Each section was comprised of a DUKW with an M-36 machine gun ring mount and an M2 .50 caliber machine gun for anti-aircraft defense and three standard DUKWs. The DUKW with the machine gun was the section leader's vehicle. He and a crew of three operated the vehicle while the standard DUKW had a crew of three; the driver, crew leader and crewman. Two additional DUKWs were assigned to the company headquarters and carried the company staff. The company also possessed six standard 2 1/2 ton cargo trucks, a 5-ton semi-trailer for the maintenance section, a 2,500 gallon fuel truck, a wrecker, a 3/4 ton weapons carrier and four jeeps.

Eventually, as the number of amphibious truck companies grew the Transportation Corps established 15 Amphibious Truck Battalion Headquarters and Headquarters Detachments in order to bring the DUKW companies under one roof. The creation of these units represented the growth of the Transportation Corps and took the DUKWs away from the Quartermaster Battalions. However, the Battalion Headquarters Detachments were not formed until late 1944 and the DUKW Companies spent most of the war under the operational control of the Quartermaster Battalions.

The success of the first DUKW units in the Pacific brought a demand for them in Europe. The 464th, 465th and 466th Amphibian Truck Companies were formed and assigned to the 4th Engineer Special Brigade. The were sent to Charleston, South Carolina for shipment overseas in June 1943.

When the DUKWs arrived in the European Theater the allies were planning the invasions of Sicily and the Italian mainland. Although the DUKWs had missed the November 1942 invasion of North Africa, the allied planners realized how important such a vehicle could be during an amphibious assault and demanded that sufficient DUKWs be made available for the invasion of Sicily which was scheduled for 8 October 1943.

The initial assault on Sicily was a difficult operation. Poor weather conditions and heavy enemy resistance highlighted every flaw in the assault plan. Infantry and Artillery units soon ran low on ammunition and other supplies as they pushed inland. The Navy had originally planned to supply the invasion beaches by using 2,000 ton, flat-bottom ships called Landing Ship Tanks (LSTs). However, many of the ships beached on "false beaches" and required causeways to be built so they could get their supplies to shore. Until causeways were built the troops had to rely on what few LSTs had actually made it to the beach, smaller landing craft and the DUKWs.

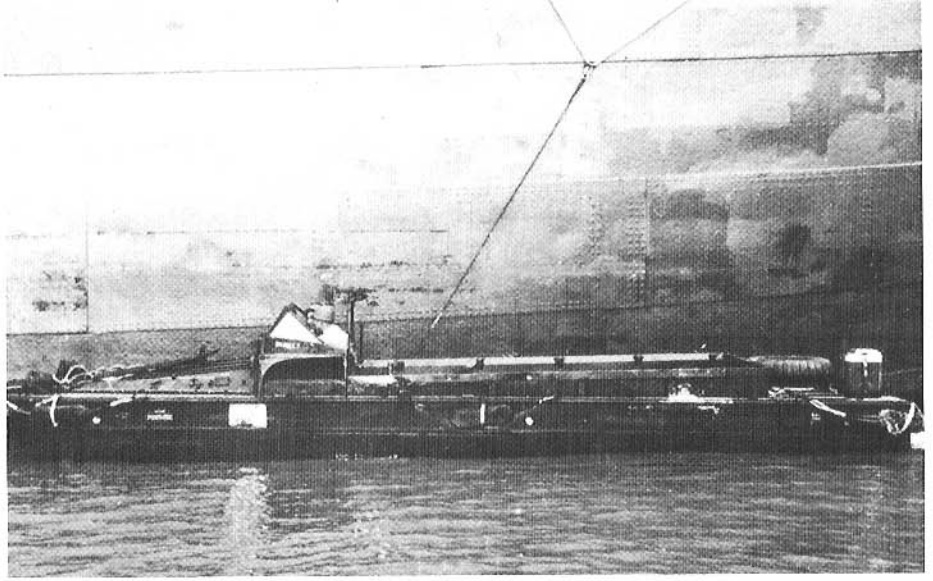
Throughout the early part of the landing the DUKWs performed yeoman service carrying vitally needed supplies to the assault troops and evacuating wounded Americans and prisoners back to the invasion fleet. At the end of the operation some naval officers offered the opinion that the invasion might not have worked had it not been for the DUKWs.

The DUKWs were used again during the invasion of Salerno on 9 September 1943. By then, the United States Army had gone a long way toward perfecting its amphibious landing techniques and was much more certain of exactly what it would need to put troops ashore on the Italian mainland. The planners estimated that at least 400 DUKWs would be needed on the American beaches to ensure success during the landing. The DUKWs were also essential for the rapid build-up of supplies once the troops got ashore and began moving inland.

During the actual assault 20 DUKWs loaded with field artillery, ammunition and anti-tank guns were assigned to the fifth wave which was scheduled to hit the beach 30 minutes after the first American troops set foot in Italy. An hour later the DUKWs were scheduled to land more artillery and ammunition.

At 0330 on the morning of 9 September the first wave hit the beach. Enemy resistance was tough and the American tanks and artillery had trouble landing. At 0500 sixty DUKWs loaded with artillery and ammunition attempted to land on Green Beach. However, enemy gun fire was too intense and naval gun fire was called in to suppress it. After 30 minutes the enemy was still firing, and the situation on the beach was critical. Thirty of the DUKWs headed to the beach under the cover of a smoke screen. The DUKWs quickly lost sight of each other in the

A driver's eye view of DUKW traffic in choppy water during loading from a cargo ship. The DUKWs waiting to get into loading position circle in the water while waiting.



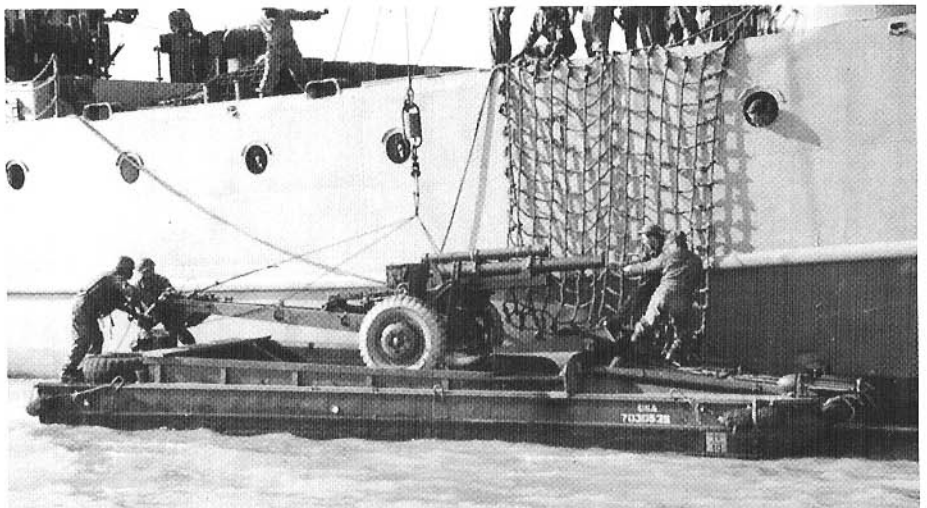
Loading in water as calm as this is what a DUKW crew hoped and prayed for — and sometimes even got.

smoke, but pressed ahead, landing in small groups during the next hour.

The situations at Yellow and Blue Beaches were much the same. Unable to subdue enemy resistance 60 DUKWs circled off shore waiting for a chance to land. Finally, the Americans were able to secure a strong foothold on Red Beach and most of the DUKWs destined for Yellow or Blue Beaches joined the 125 DUKWs landing on Red Beach.

After the initial landings the DUKWs were put to work delivering vital food and ammunition to the troops as they moved inland. Enemy artillery fire had destroyed many landing craft

DUKWs could move artillery from a ship directly to prepared firing positions ashore. Eventually DUKWs would actually be used as firing platforms for the artillery, allowed the big guns to get into combat even before they hit shore, this materially assisted the success of several landings



along the beach and later landing craft had difficulty approaching the beach and finding enough space to drop their ramps. Congestion and confusion soon resulted as supplies piled up on the beach. There were not enough trucks ashore to move the supplies inland and while the frustration among the logisticians increased over the congestion on the beach the DUKWs started moving supplies directly from the ships to inland dumps. Unfortunately, there were not enough DUKWs and their heavy usage and earlier entry into combat had reduced their numbers even further. Between 9 September and 1 October a daily average of 90 landing craft and 150 DUKWs moved 190,000 troops, 30,000 vehicles and 120,000 tons of supplies across the invasion beaches at Salerno.

Three weeks after the invasion the allies captured the key port of Naples. The Germans understood the value of the port to the invading allies and made sure that everything of importance was damaged or destroyed. Ships were sunk in the channel, piers damaged and the area littered with mines and booby traps.

The engineers estimated that it would take three months to repair the port and put it back into working order. Until then supplies would have to be unloaded from ships anchored inside the harbor onto smaller landing craft or DUKWs. Because of the DUKWs unique ability to immediately move cargo inland, it was the preferred vehicle for off loading.

A fleet of some 600 DUKWs was assembled in the port of Naples by the end of October, and despite many difficulties the Allies were unloading 3,500 tons of supplies each day — nearly half the amount the fully operational port of Naples had unloaded before the war.

Lessons learned by the Engineer Special Brigades in the use of their DUKWs during the southwest Pacific campaign and the invasion of Sicily and Italy were incorporated into the way DUKWs were utilized during the Normandy Invasion. A full 19 companies were allocated to the invasion with 12 assigned to Omaha Beach and 7 to Utah Beach. All of the DUKWs were pre-loaded with ammunition and other cargo which would be critical during the early stages of an invasion.

The 453rd, 458th and 459th Transportation Corps Amphibian Truck Companies were under the command of the 131st Quartermaster Battalion (mobile) and assigned to the initial assault. Their mission was to deliver their cargo and then shuttle between the beach and the ships, offloading supplies and establishing supply and ammunition dumps as needed.

The DUKWs embarked on LSTs in Weymouth on 5 June and moved across the channel for the invasion. The LSTs off loaded the DUKWs fourteen miles off shore shortly after the invasion began. The amphibians formed into columns and headed for shore. During the next two days the three companies lost 41 DUKWs while delivering supplies from ships to supply dumps established just behind the front lines. Their ability to move vital supplies directly to the front lines and the courage of the crews under enemy fire enhanced the reputation of DUKW units among the front line troops.

After D-Day the DUKWs were vital in unloading vessels. Most of the ports the allies captured had been sabotaged or damaged by the retreating Germans. Harbor cranes, used for unloading, were destroyed, piers were ruined and many of the critical channels into the port had been blocked by scuttled ships. Until port facilities could be rebuilt DUKWs were crucial for moving supplies. In fact between 6 June 1944 and 8 May 1945 DUKWs moved 3,050,000 tons of the 15,750,000 tons unloaded by the allies in Europe during the war.

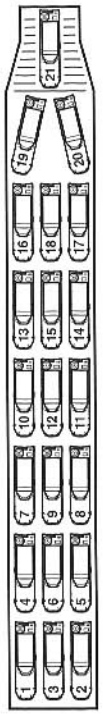
Before the war ended in Europe DUKWs were used for one last amphibious operation. During the famous Rhine River crossing at the end of March 1945, 370 DUKWs were used to move men and supplies to the far bank.

(Above) One after another a line of DUKWs emerge from the water and head for off loading points.

(Below) Despite being unarmed and unarmored the DUKW still developed a reputation for going anywhere and doing anything.

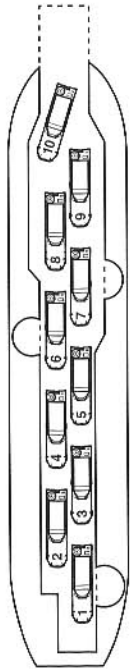
Landing Ships

Landing Ship Tank (LST)



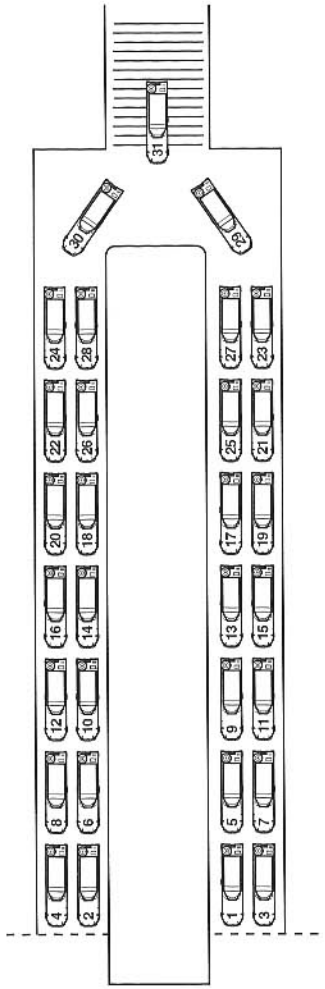
21 DUKWs

Landing Ship Men (LSM)

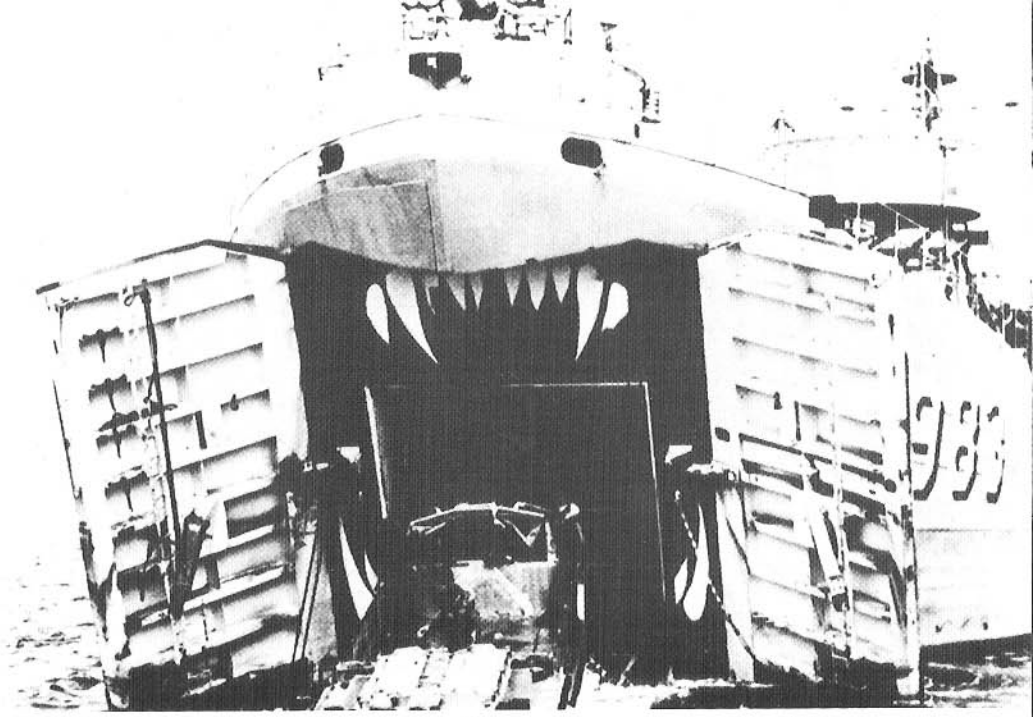


10 DUKWs

Landing Ship Vehicle (LSV)

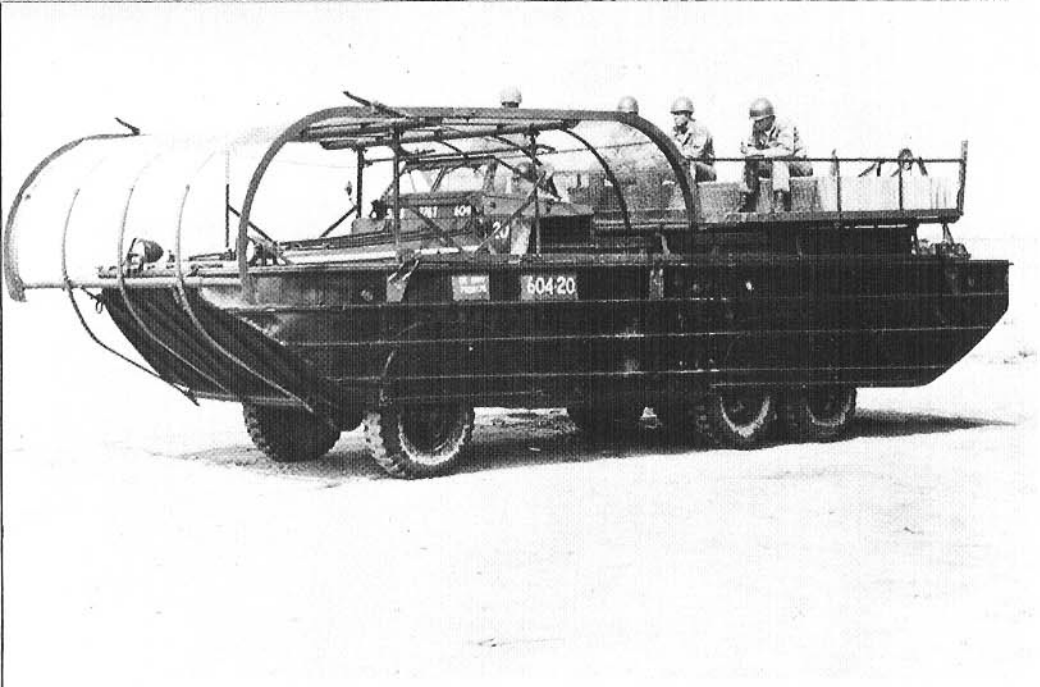


31 DUKWs



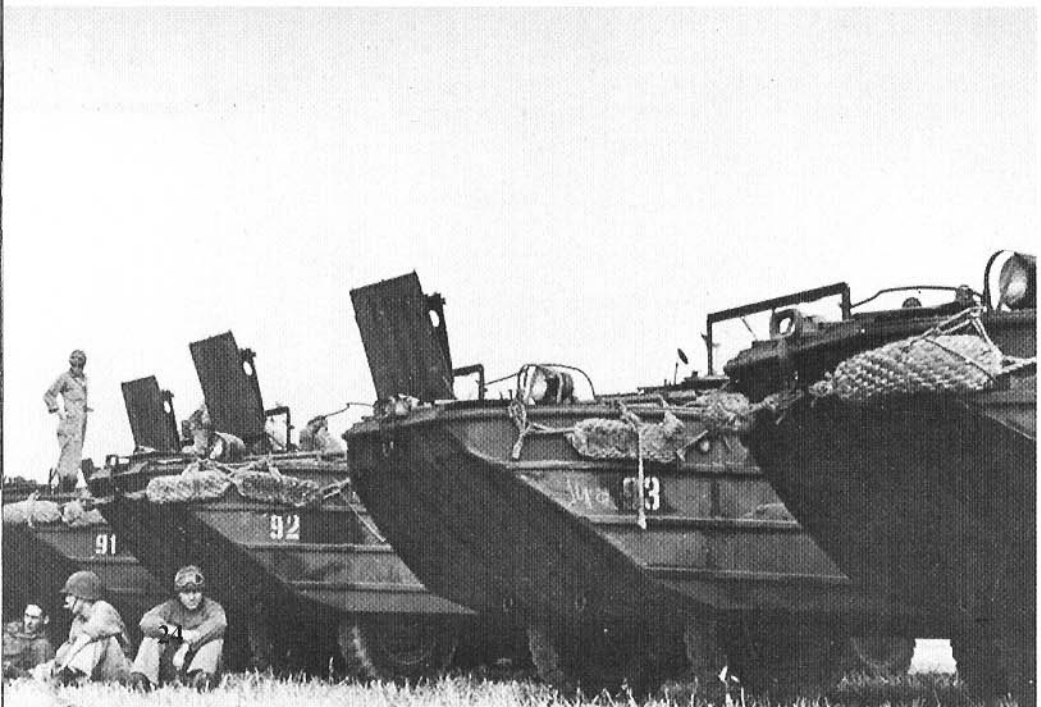
A DUKW unloads through the open mouth of a rather mean looking LST.

A DUKW pauses by a knocked out German Mk. VI Tiger tank, while its crew has a look. The crewman on the DUKW is manning an M2 .50 caliber machine positioned in the ring mount.



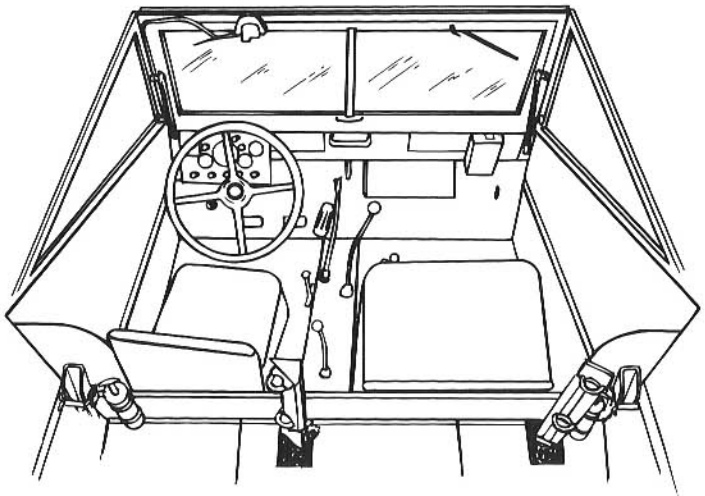
An early experiment to improve the traction of the DUKW as it moved across the beach was the Mat Laying DUKW. It carried 300 feet of metal matting in its cargo bed which was fed over the cab and then down under the wheels. It was found to be too cumbersome and was not adopted.

While awaiting orders after landing most of the crews relax, while others do some minor maintenance to their vehicles.



The DUKW's ability to bring its cargo from ships off shore directly to an inland supply dump or directly to units at the front was invaluable in maintaining the momentum of a landing and keeping vitally needed supplies from becoming lost in the mountain of equipment being off loaded on an invasion beach.

Driver's Compartment



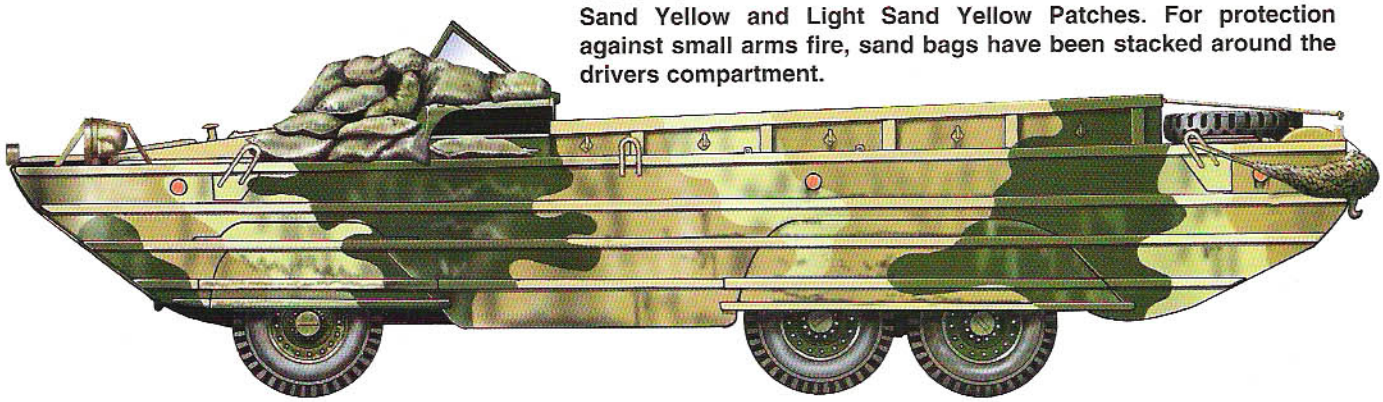
One of the first production DUKWs. They initially rolled off the assembly line in lusterless Olive Green (FS34087) with Slate Blue letters and numbers.

Loaded and ready to go, 7032555 has a replacement wheel skirt that has not been painted Olive Green.

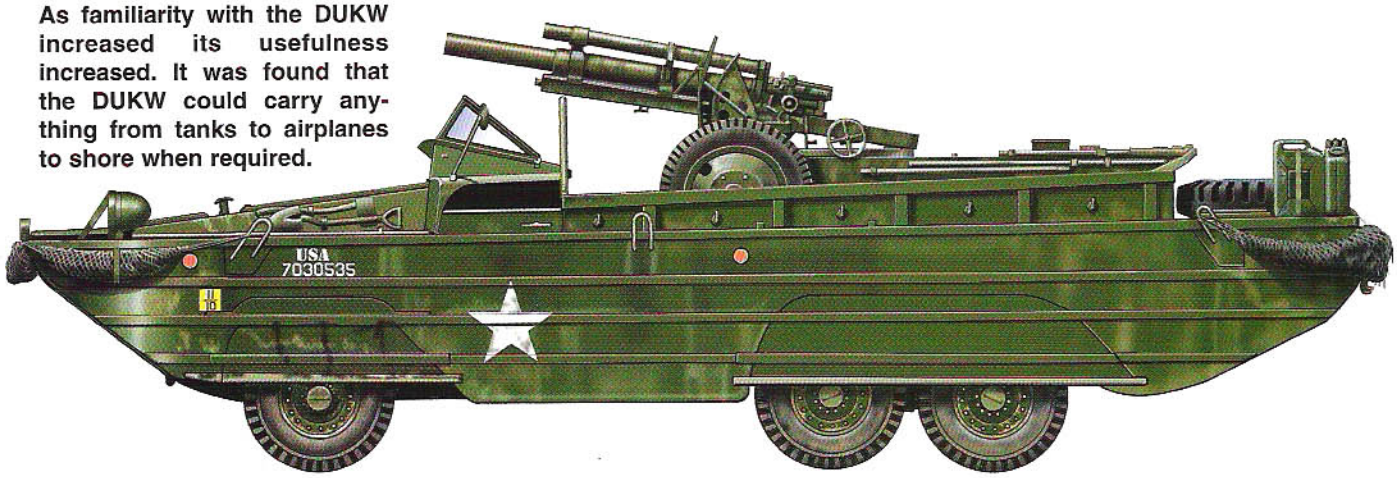
Although carrying US markings, this DUKW was actually used by the British during the invasion of Sicily.

A British DUKW in Sicily during July of 1943, camouflaged in Dark Sand and Black.

USMC DUKW on Iwo Jima in 1945. Colors are Olive Drab with Dark Sand Yellow and Light Sand Yellow Patches. For protection against small arms fire, sand bags have been stacked around the drivers compartment.

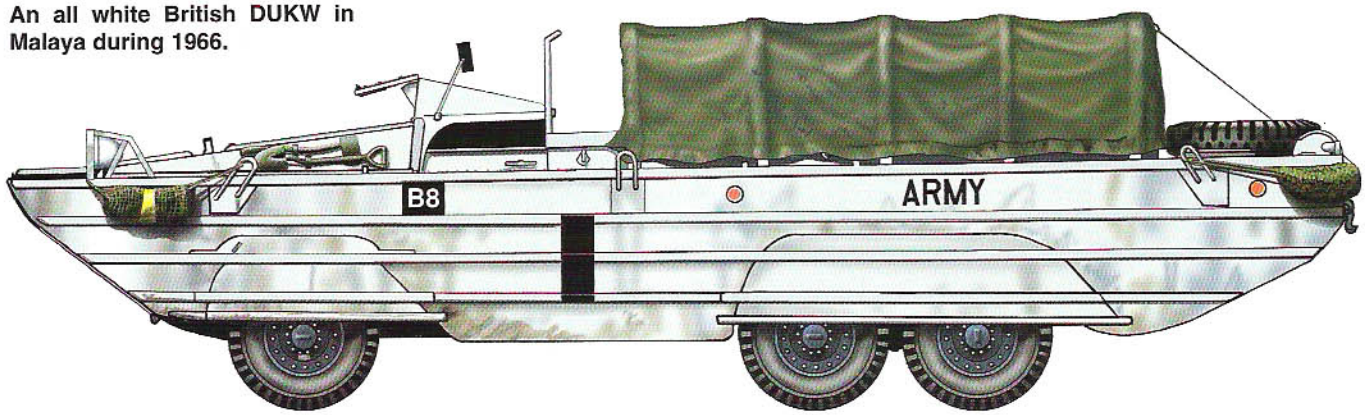


As familiarity with the DUKW increased its usefulness increased. It was found that the DUKW could carry anything from tanks to airplanes to shore when required.



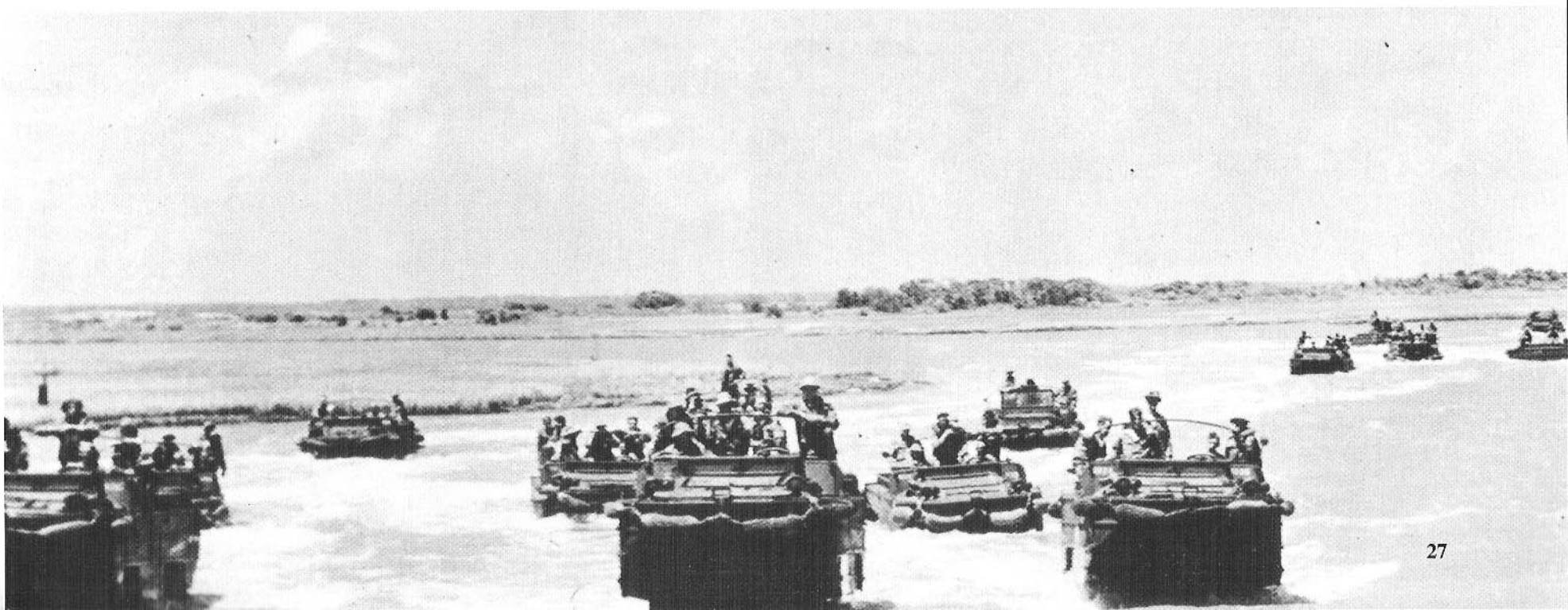
The DUKW was used extensively during the Korean War to bring supplies ashore where no port facilities were available. The significance of the Red stripe outlined in White is not known.

An all white British DUKW in Malaya during 1966.

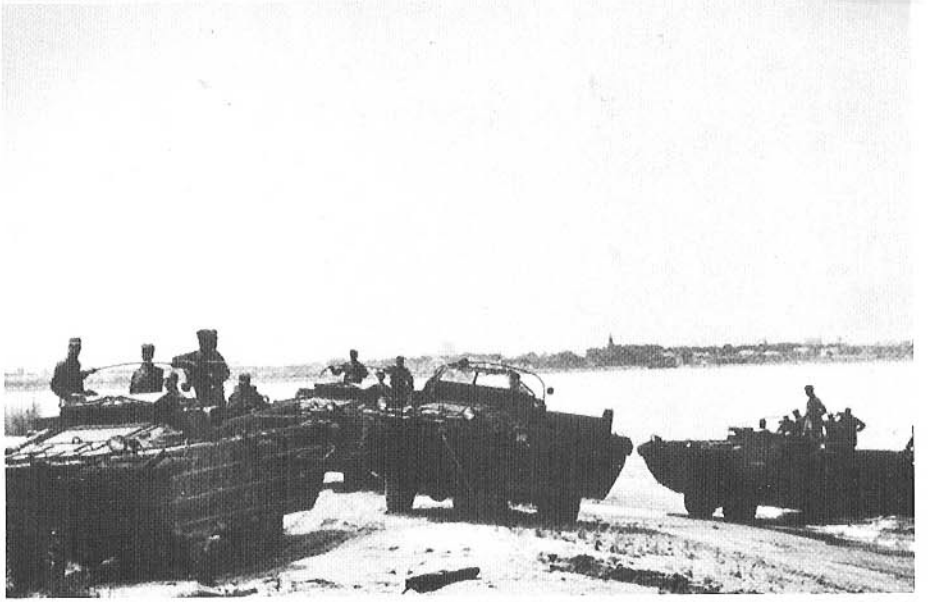


(Above) An entire company of DUKWs moves through shallow water with supplies and replacements for a front line unit.

(Below) To GIs running short of ammunition, food or water this was a welcome sight.



A pair of British DUKWs bring supplies ashore from a ship anchored in deeper water while an LST is being unloaded in the background. Both deliver necessary supplies to front line troops.



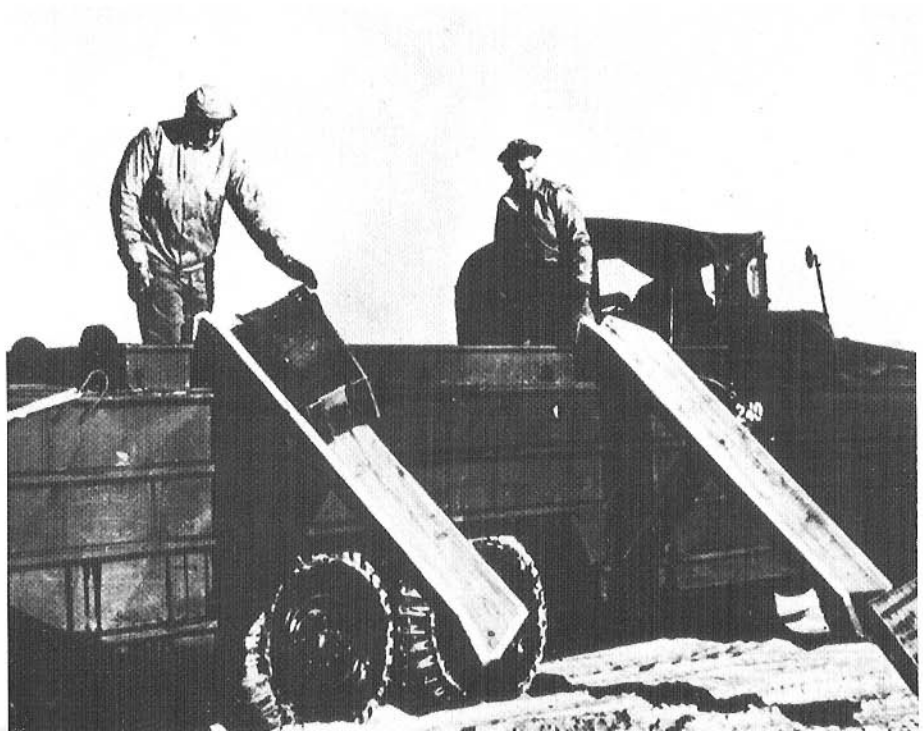
These crews come ashore and await the order to move out. The effects of battle can be seen by the plume of smoke in the background.

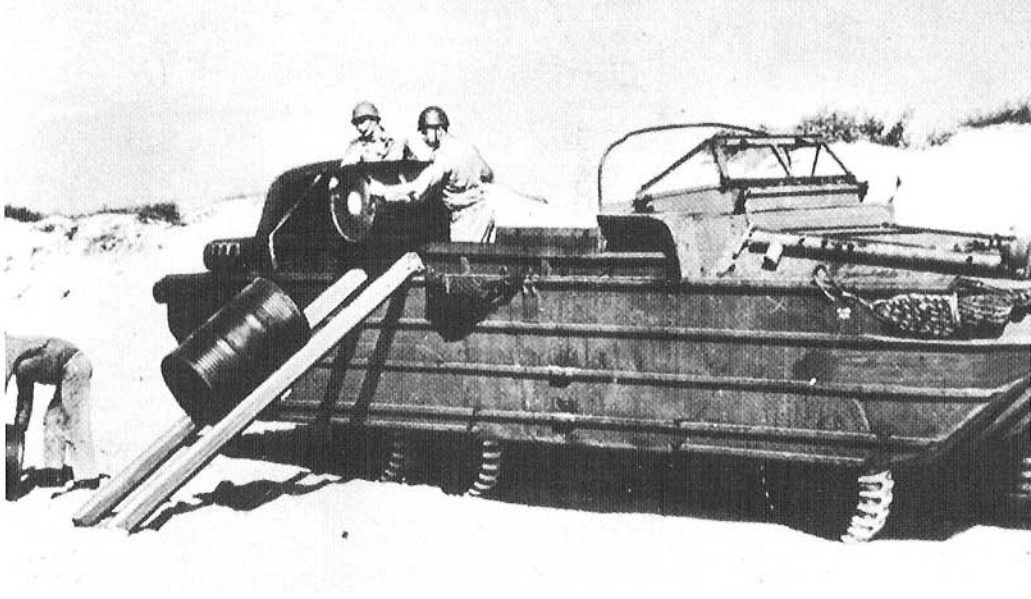
The British, too, found the DUKW to be a useful vehicle and they purchased enough to form several companies. British troops advance inland while DUKWs unload their cargo nearby.

Crewman take a break before heading back into the choppy seas. Riding a DUKW through choppy water and across rough terrain could be an exhausting affair.

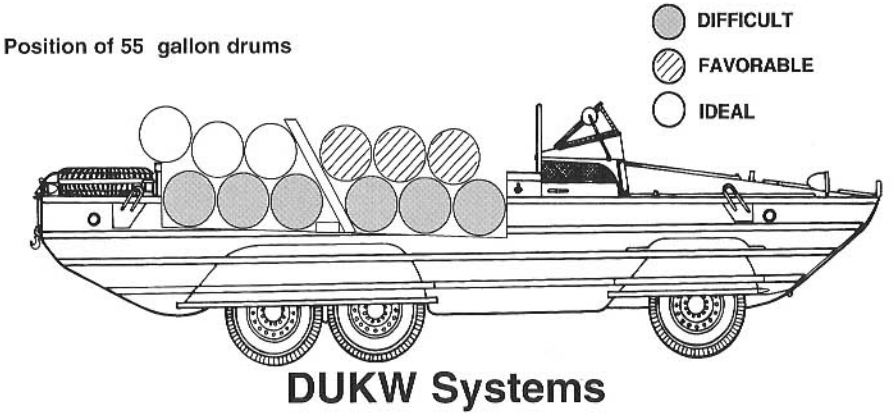
Another way to utilize the DUKWs unique capabilities was by having it tow barges loaded with supplies to the beach. This allowed huge amounts of bulk supplies to be brought quickly to the beaches where beach support personnel could off load them.

Unloading boxes was expedited with the use of the "Hog Trough". These simple wooden troughs, built by the crews allowed boxes of cargo to be off loaded quickly and easily.

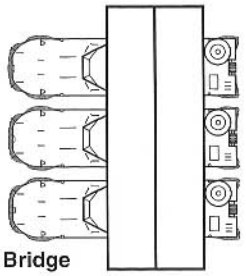




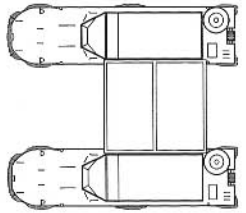
Off loading a DUKW in an invasion area, which was sometimes under enemy fire, presented many problems, but the resourceful crews quickly adapted. Barrels of water and fuel were always vital, but unloading the heavy drums was difficult. Crews developed simple skids of wood which allowed two men to slide a full barrel over the side of the DUKW and one man to roll it away.



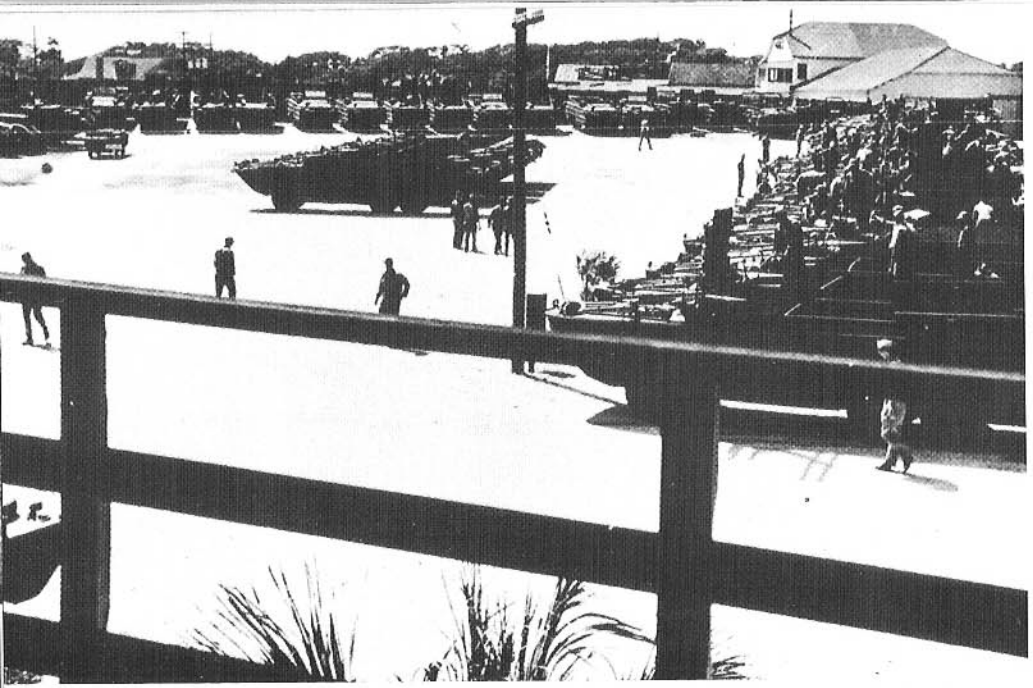
DUKW Systems



Pontoon Bridge

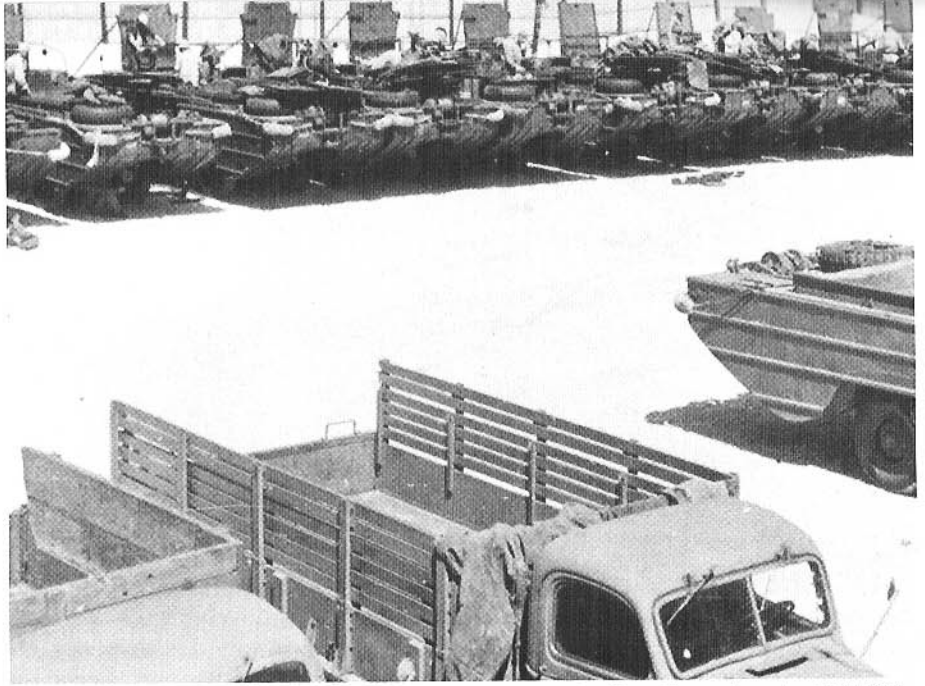


2 DUKW Platform Ferry



A DUKW park in France. After their hard use during the Normandy landings a great deal of maintenance was required.

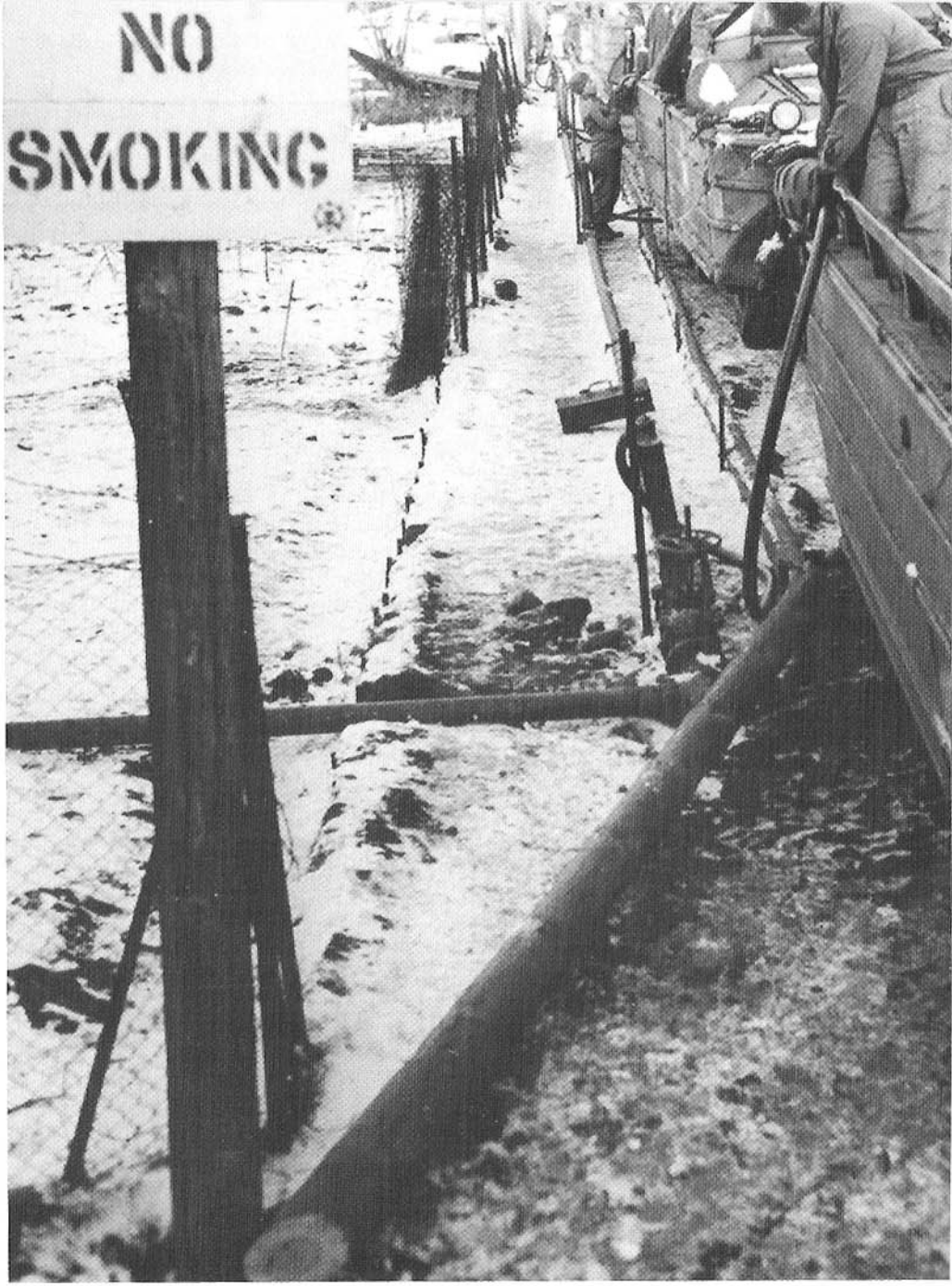
(Below) A DUKW platoon enters the water of a French harbor and heads back out to off load more cargo from ships off shore.



(Above) Maintenance trucks are in the foreground with a line of parked DUKWs in the rear. The engine access panels have been raised in preparation for a maintenance inspection. Other DUKWs can be seen parked along the road behind the park.

A crew heads back out for more cargo while an LST off loads cargo in the background.

The crew of a DUKW pose for the camera as they head back to sea.



A DUKW refueling park during the last days of the war.

PACIFIC

While the DUKWs were busy in Europe the allies in the southwestern Pacific were also putting the vehicle through its paces. DUKWs had proven their worth during operations in New Guinea and Bougainville in 1943. During the landing on Bougainville the 451st AmphibianTruck Company off-loaded over 2,500 tons of supplies in one day. This figure represents over 1,000 round-trips by the DUKWs of the company.

With such impressive results the number of DUKWs in the Pacific increased and their role was quickly expanded. During the invasion of Kwajalein, the US Army 7th Infantry Division pre-loaded their DUKWs with artillery pieces and ammunition. The DUKWs allowed the division to bring its artillery into the battle much quicker than the Marine units participating in the invasion and consequently resulted in fewer Army casualties.

Surprisingly the Marines had not been quick to adopt the DUKW. Its ability to bring vital supplies across the beach would seem to be a natural adjunct to their amphibious doctrine, but it was not until Peleliu, in September 1944, that the Marines fielded their first DUKW unit. Even these almost didn't make it. Fifty DUKWs arrived at the docks just before the invasion task force put to sea. The ships were fully packed and the Marines struggled to make room for the new vehicles. Finally, after much straining the DUKWs were loaded on board. As soon as the task force left harbor another problem surfaced. No one had been trained to operate the DUKWs. The new vehicles were assigned to the First Motor Transport Battalion. The Marine truck drivers did their best to learn the art of DUKW driving during the voyage to the invasion. Despite all the problems the DUKWs did well during the operation and the Marines made them an integral part of future operations.

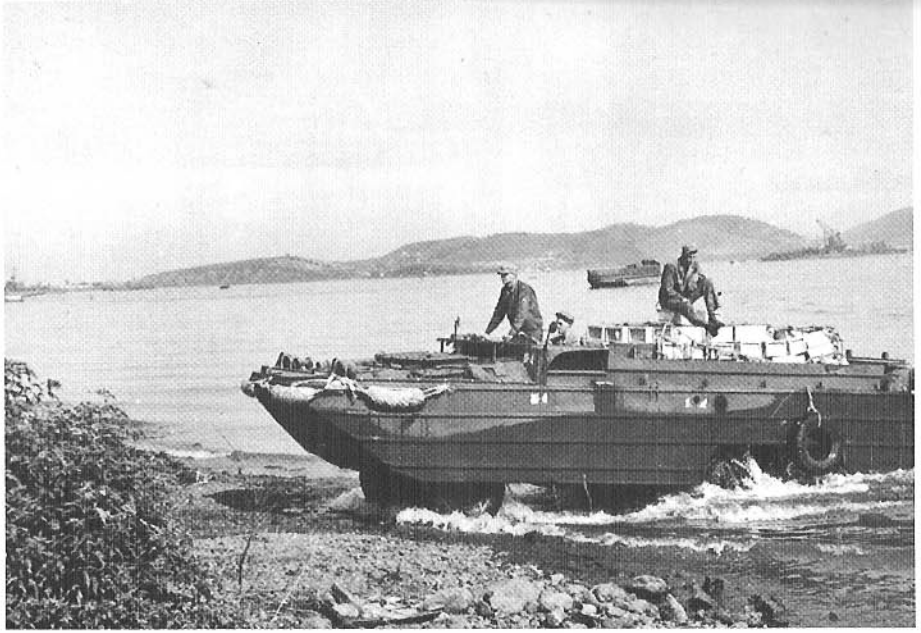
The DUKWs figured prominently in the invasion of the Philippines. Thirteen full companies were used and represented the largest use of the DUKWs in the Pacific up to that time. At Tacloban in April 1945, 20 DUKWs from the 813th Amphibian Truck Company moved 1,847 tons of supplies in 24 hours. The vehicles had to negotiate a 9 1/2 mile round trip from the ship to the supply dump and back again. Each vehicle carried a total of 92.3 tons of cargo, an amount which corresponded to each DUKW making almost 40 trips from the ship to the dump in a one day period.

DUKWs also proved invaluable during the capture of Manila. The Japanese had filled the harbor with sunken wrecks, but despite the obstacles the Army was able to capture the city and supply its troops through the decimated harbor using DUKWs.

One Marine Corps and three Army DUKW companies supported the landings on Iwo Jima. Most of the DUKWs initially carried artillery and ammunition ashore and then carried wounded back to the ships. The DUKW was one of the few wheeled vehicles that could negotiate the deep black sand of the Island., but travel was slow. Many DUKWs deflated there tires to 5lbs of pressure in order to keep moving. Heavy enemy fire also took a heavy toll, during the first five days of operations over 50% of the DUKWs were destroyed by enemy fire.

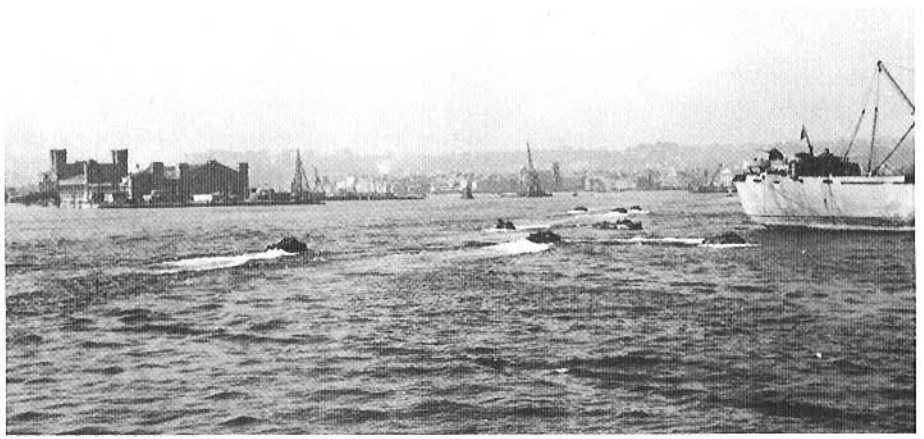
DUKWs participated in the final Pacific battle on Okinawa and were indispensable in moving artillery pieces and ammunition directly to the troops fighting against the Shuri line.

A total of 21,147 DUKWs were built by the end of the war. The Army organized 70 amphibian truck companies during the war and assigned 12,829 soldiers to man them The Marines operated 87 DUKWs during the war, initially assigning DUKWs to Motor Transport Battalions, but eventually assigning a platoon of DUKWs to each of their Amphibious Tractor Battalions.

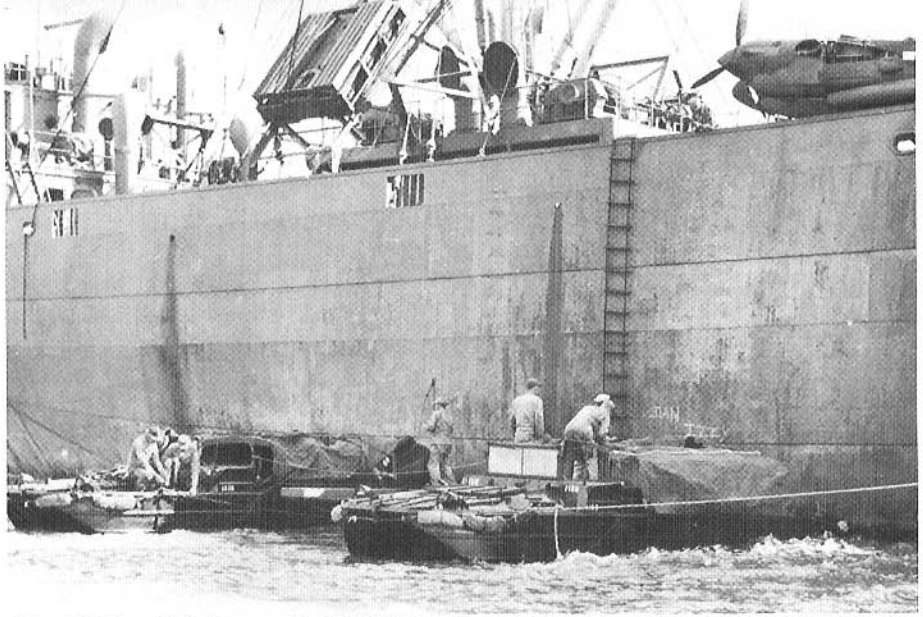


DUKWs were vital in the Pacific where many islands and atolls had no port facilities. This DUKW, loaded with supplies and a weary crew, navigates a rocky beach and heads inland in New Caledonia.

Even when harbor facilities were available DUKWs were invaluable when wharf space was overwhelmed by the number ships to be unloaded.



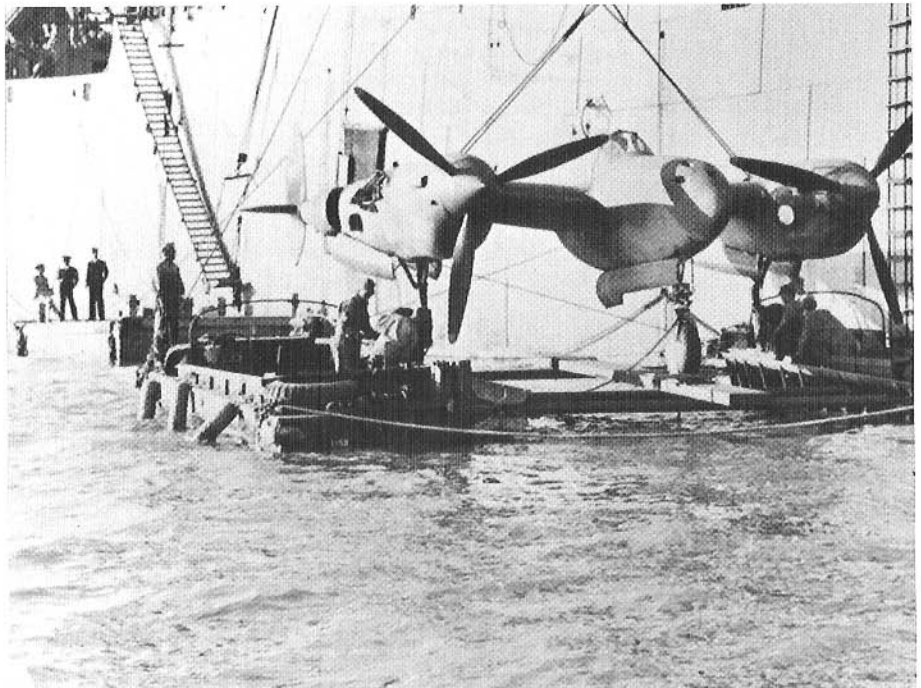
Great Britain also found the DUKWs quite useful. The British organized 12 amphibious truck companies, each with 120 DUKWs, and assigned over 5,500 of their soldiers to operate the vehicles during World War II.

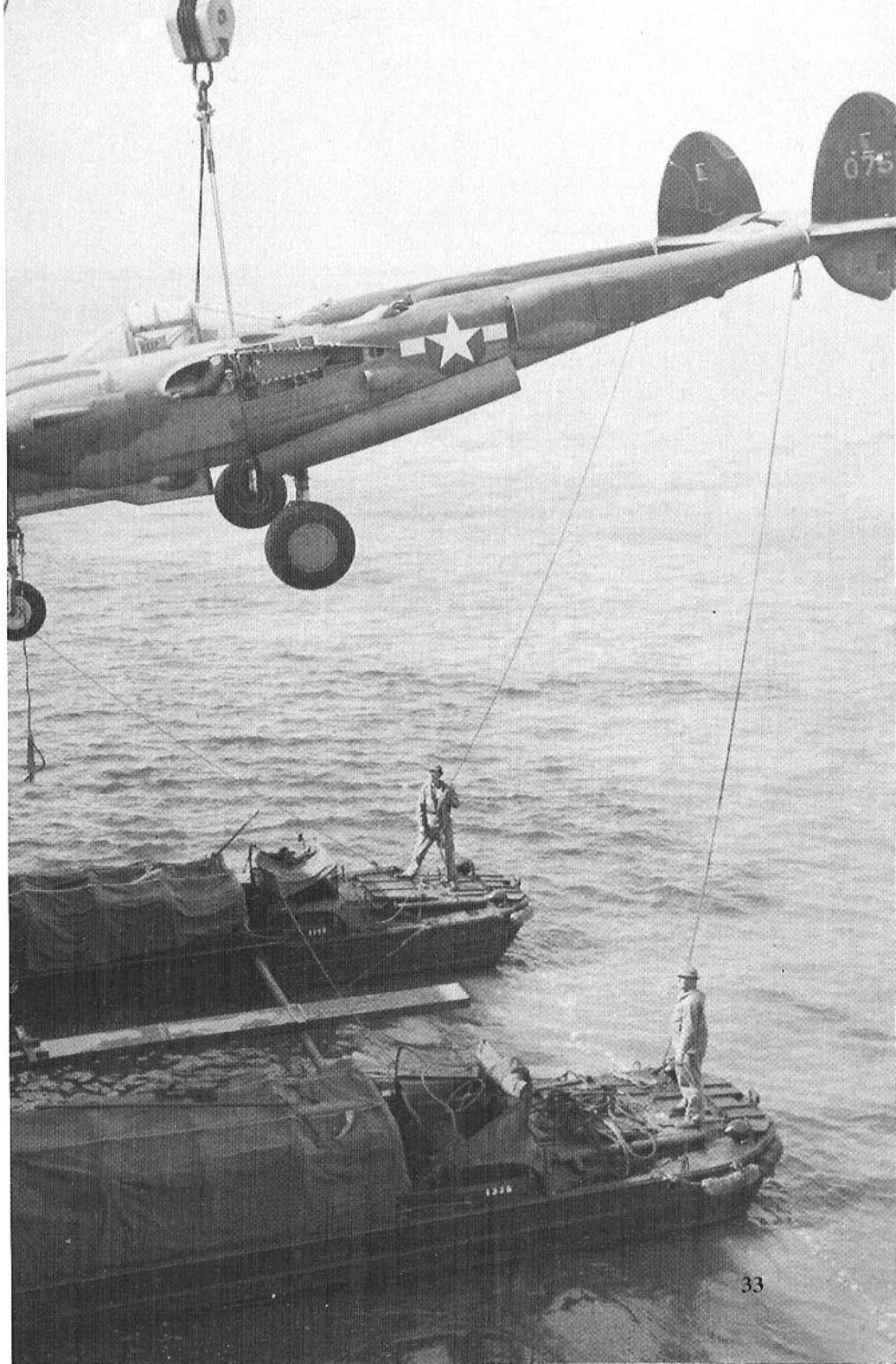


(Top) With a little ingenuity DUKWs were also able to deliver oversized cargo to the beach. Getting fighter aircraft from a ship to a Pacific island when no port facilities were available was a bit tricky. Two DUKWs were linked together with a steel pole and beam center section.

(Right) A Lockheed P-38 Lightning is hoisted over the side for loading on the center section between the two DUKWs.

(Bottom) With each of the main wheels resting on the decks of a DUKW and the nose wheel resting on the center beam, the Lockheed P-38 Lightning is lashed down between the two DUKWs and taken ashore.





(Top) A DUKW with its breakwater plate raised navigates over a dune and heads inland.

(Bottom) The Marines soon found the value of the DUKWs and quickly formed a unit of their own to operate the versatile craft.

Post War

After the war DUKWs continued in service after the war with many countries. The United States, Britain, France and Australia kept their DUKWs in service, although in greatly reduced numbers. Retaining the DUKW in service was a fortuitous move for the United States when events in the Far East brought America back into battle on the Korean Peninsula.

DUKW units were reactivated and sent to Korea almost as soon as the war began. The sudden demand for DUKW crewman and mechanics was expeditiously handled with the formation of the 1st Transportation Replacement Training Group which operated out of Fort Story, Virginia. This unit quickly provided needed training for DUKW crewmen and ensured that DUKW units at the at the front were properly staffed. DUKWs were an instrumental part of getting cargo ashore in Pusan and later Inchon harbor. After Inchon the American supply lines stabilized and port facilities were improved. DUKWs continued to serve in Korea until the end of the war but seldom had a chance to conduct major operations using their specialized skills.

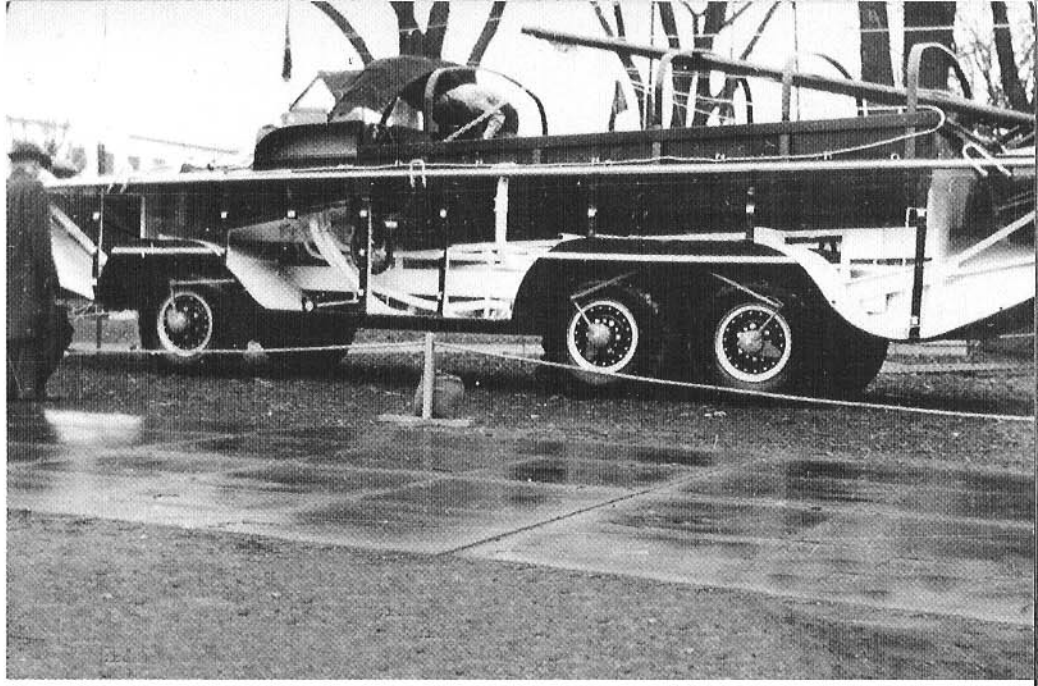
The success of the DUKW led to several experiments toward developing a bigger and better amphibious version of the DUKW. The Army experimented with the XM-147 Super DUKW which was manufactured by General Motors in 1953. This vehicle incorporated many improvements over the original vehicle. Equipped with a larger 145 hp engine the Super DUKW could carry 4 tons of cargo, reach a speed of 48 mph on land and 11 mph in the water. Next the Army built the XM-148 Gull, which was a bigger version of the basic DUKW and featured improved load carrying performance. Finally, the XM-157 DRAKE was developed in 1956. The DRAKE was an 8 ton 8 X 8 amphibious vehicle which featured many advanced features including a pneumatic suspension, removable wheels and axles, an adjustable propeller, two six-cylinder motors and an aluminum hull. All of these improvements and advanced features gave the DRAKE substantially improved marine characteristics.

Each of these newer versions offered improved performance and load carrying capability but each would have been expensive to put into production. Due to their high cost none of the improved line of DUKWs were ever authorized for production.

DUKWs continued in service with the United States Army until the mid-1960s when they were gradually replaced by a new series of amphibious vehicles. These were the Lighterage Amphibious Resupply Craft (LARC) and the Barge Amphibious Resupply Craft (BARC).

Other nations also maintained their fleet of DUKWs well past the end of the Second World War. The British kept their DUKWs until 1974. These units served in England, Malaya and other parts of their former empire. The French, used their DUKWs well into the 1960s.

Although DUKWs were used primarily by the military many found their way into civilian service. Police departments, fire stations and rescue units all found the amphibious capability of the vehicle to be invaluable in an emergency. DUKWs operated by various National Guard units were used to assist civilians during floods, hurricanes and other natural disasters.



A DUKW cut-away was part of the exhibit during the Presidential Inauguration in January 1949.

One of the many civilian displays after the war in which the DUKW participated. The driver's compartment of the DUKW can be seen in the foreground. The area just below the windshield is filled with data plates which give the driver and crew ready access to key information about the operation of the vehicle.

A Company of DUKWs show off their unique vehicles by giving scores of interested civilians a ride.

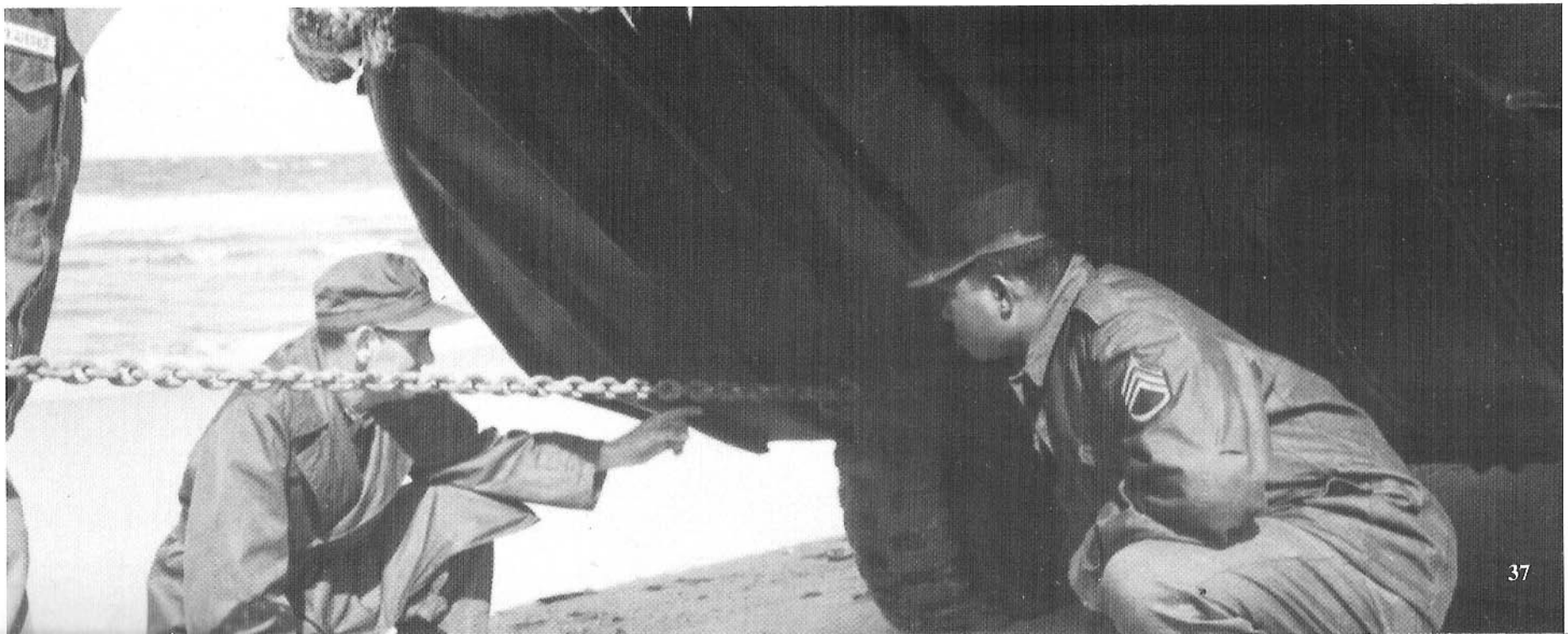
DUKWs continued in service after W.W.II. These DUKWs of the 458th Amphibian Truck Company from Camp Leroy Johnson are evacuating civilians caught in the 1959 flood of Jefferson Parish, La.

A DUKW, leading a truck heads out looking for more civilians caught in the flood.

A DUKW with a rescued civilian aboard moves through an intersection in search of more stranded people.

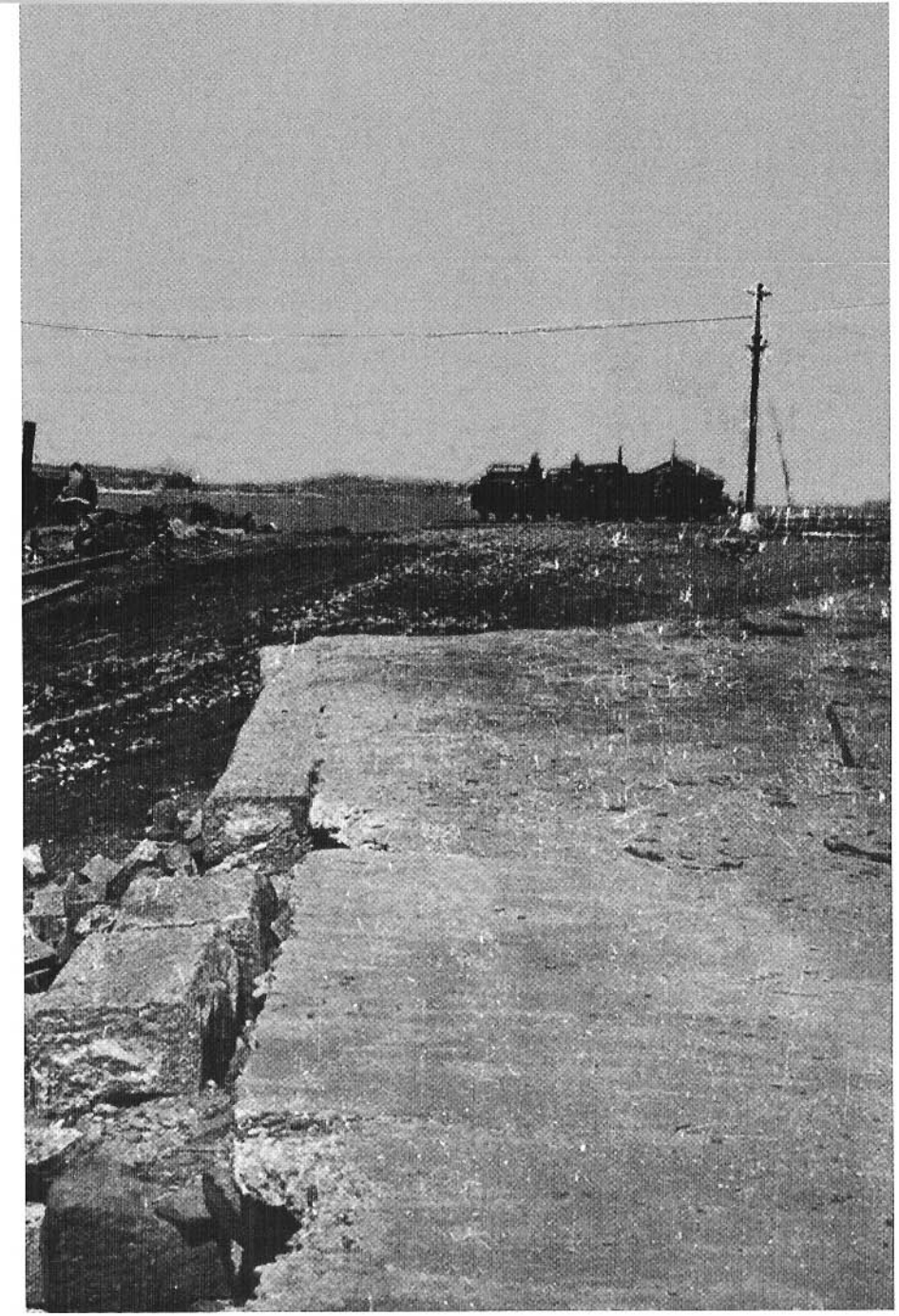
(Above) DUKW units became an integral part of the US military during W.W.II. After the war these vehicles and their unique capabilities were retained. This DUKW loaded with troops is practicing beach landings.

(Below) Training with the DUKW was constant. This crew learns the ins and outs of using the tow chain.

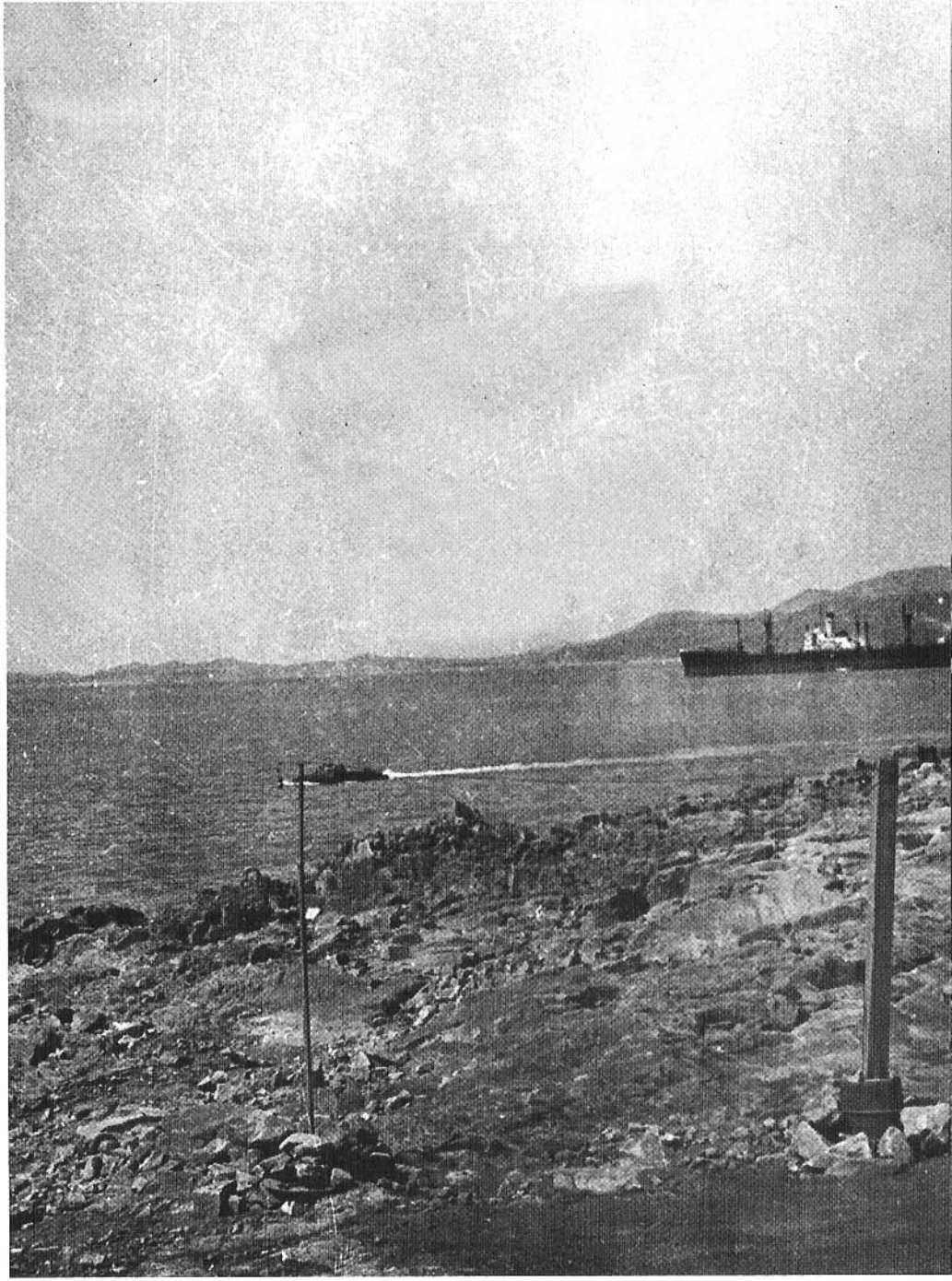


(Above) DUKWs were back in action in Korea. Poor harbor facilities coupled with the need to outflank the enemy at Inchon brought the DUKWs back into combat use. This ship load of DUKWs heads into a Korean harbor to off load.

(Below) A DUKW company has set-up in the parking lot of a Korean town. The hardstand allowed crews to service their vehicles without having to battle the mud.

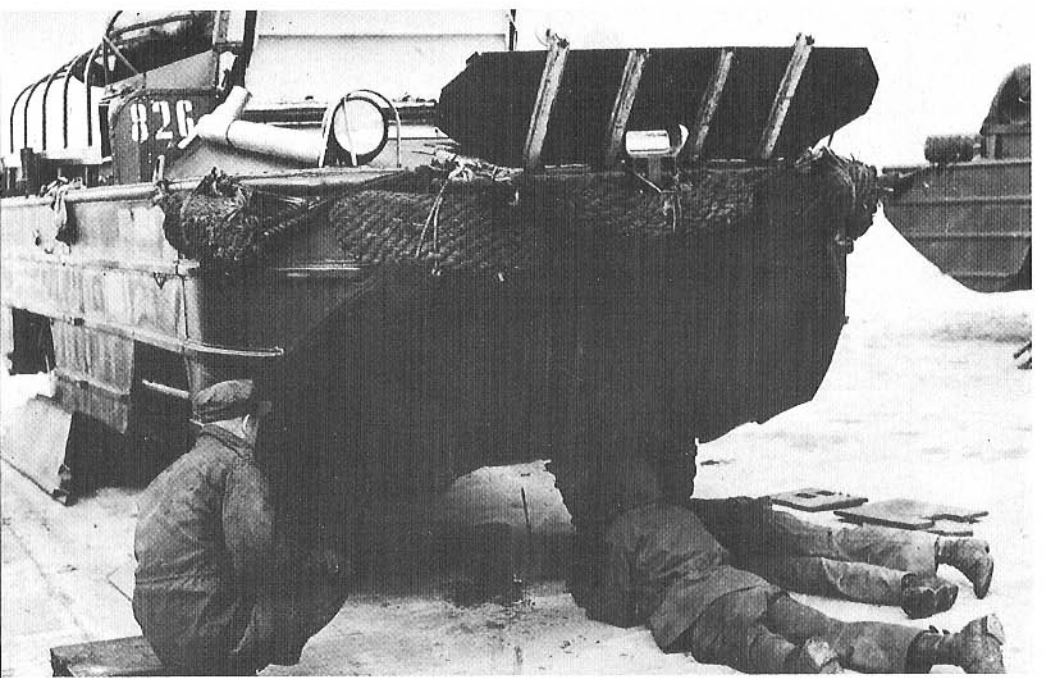


A group of DUKWs wait for orders to move forward and off load near a battered Korean town.

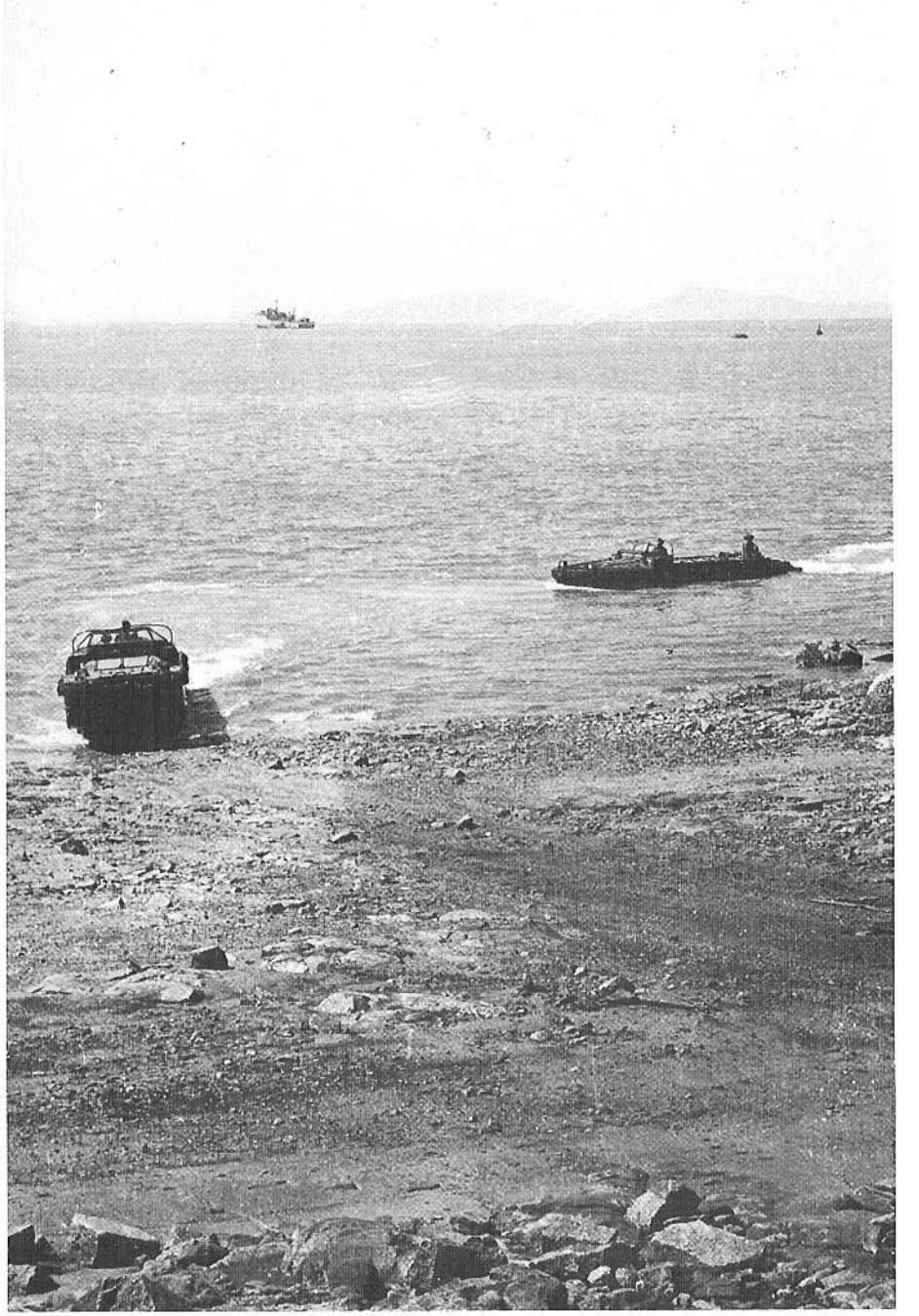


A lone DUKW moves past an empty cargo ship, riding high in the water of a Korean harbor.

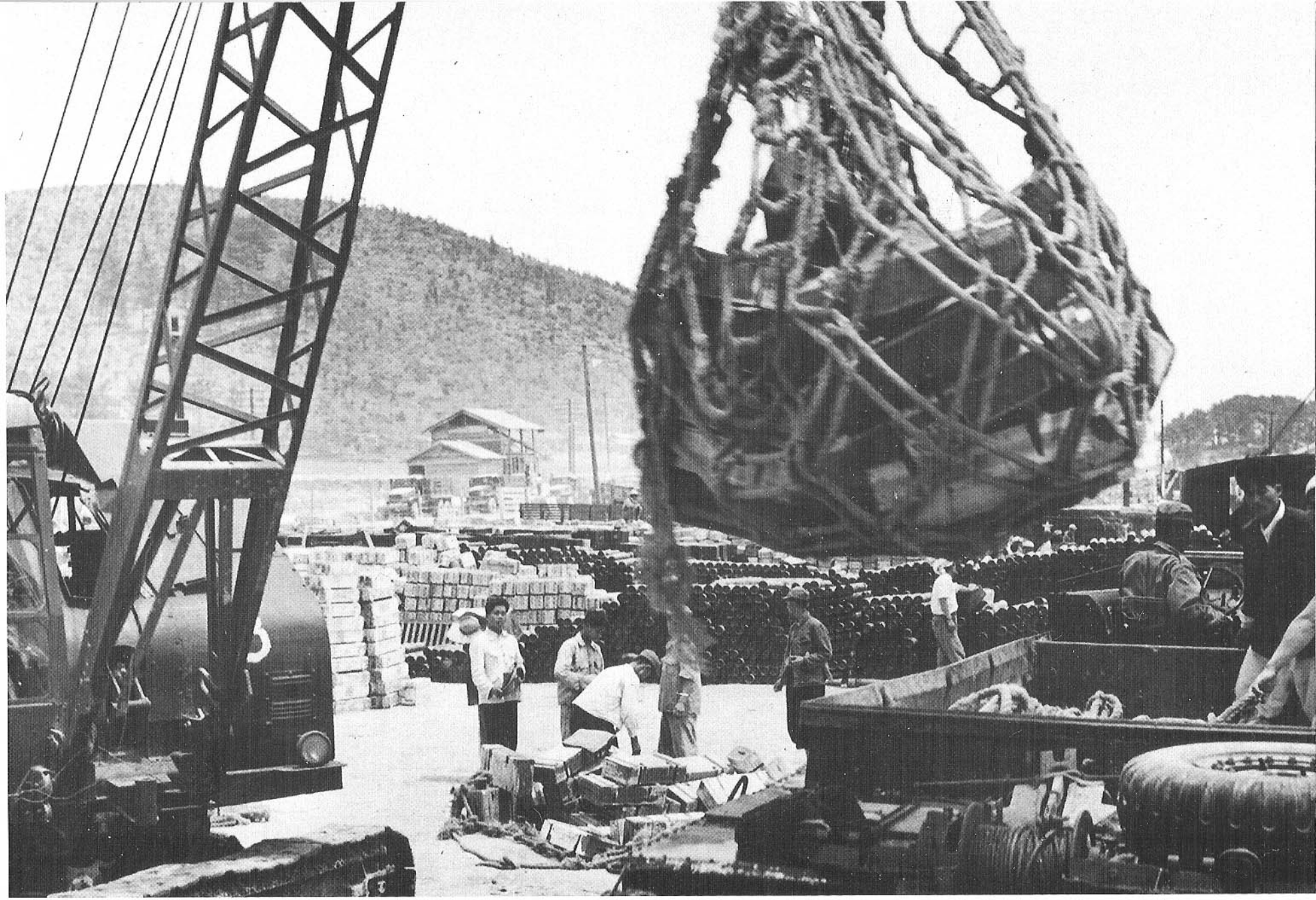
Under the watchful eyes of Korean children, a company of DUKWs head back into the ocean to off load more supplies from the invasion fleet.



Maintenance was always a concern with the complicated systems of the DUKW. The problems were aggravated by the cold of the Korean winter. These mechanics have the advantage of working on concrete instead of in mud.



A pair of DUKWs turn for the rocky beach in the waters off Korea. Korean beaches and harbors were notorious for their difficult tides and often required ships and DUKWs to take circuitous routes to and from the beach.



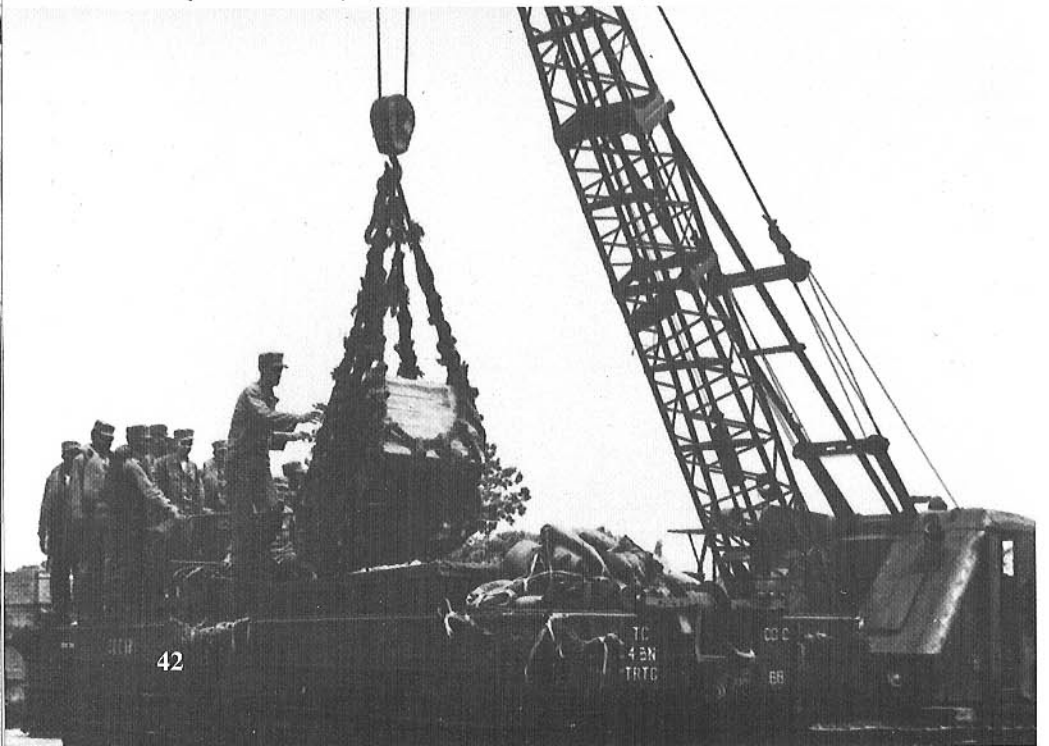
A DUKW is unloaded by crane at a transfer point in Korea. Nets were laid into the DUKW's cargo bed and the cargo was stacked on top of it. At the unloading point a crane could just pick up the net with the cargo inside the net.

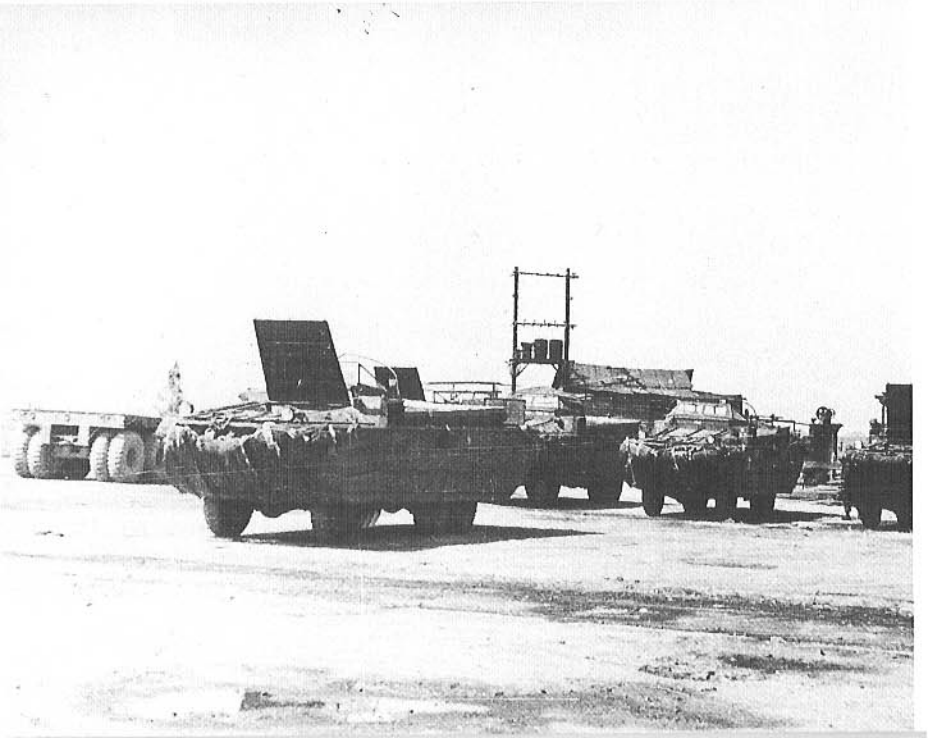
Net loads of supplies are taken from DUKWs and loaded onto rail cars. Empty nets are returned to the DUKW for the next load.

Proper loading and off-loading was a critical function of the DUKWs and the process was heavily stressed in training. Markings on the DUKW are for Transportation Corps, 4th Battalion, Company C, Training Command.

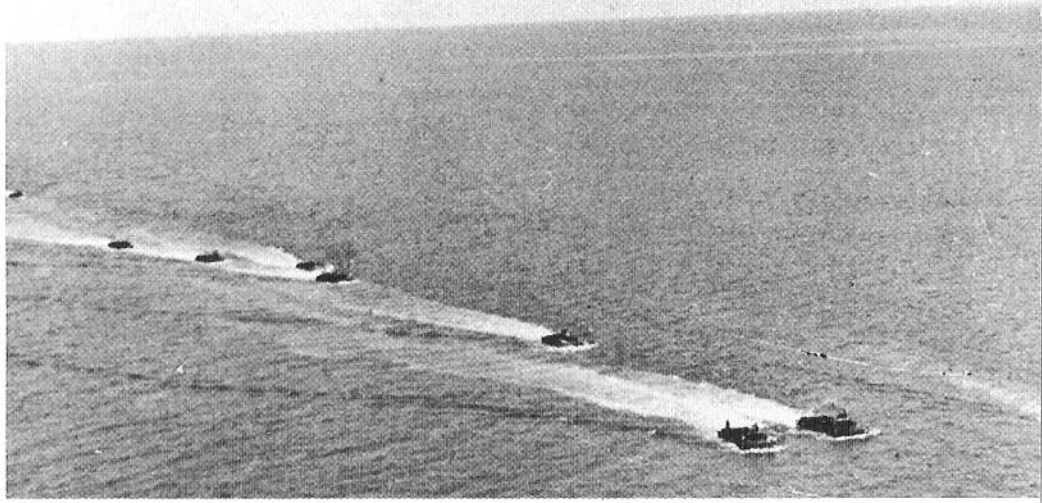
Keeping track of the DUKWs and their movement was often a difficult task, insuring that they went to the correct ship and delivered their cargo to the correct point was a function of the DUKW Beach Control Point.

A group of DUKWs are serviced in Korea. Three of the vehicles have their engine access panels raised.





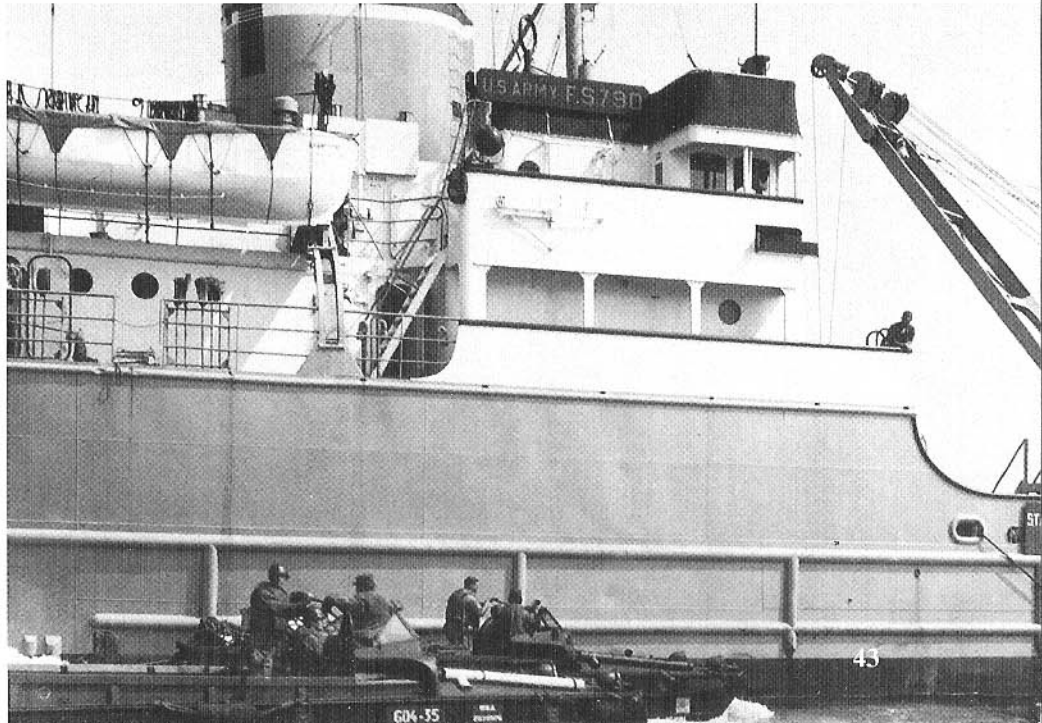
A DUKW negotiates the rocky shore of a landing site in Korea. Outcroppings of rocks were a constant threat to DUKWs as they came ashore.

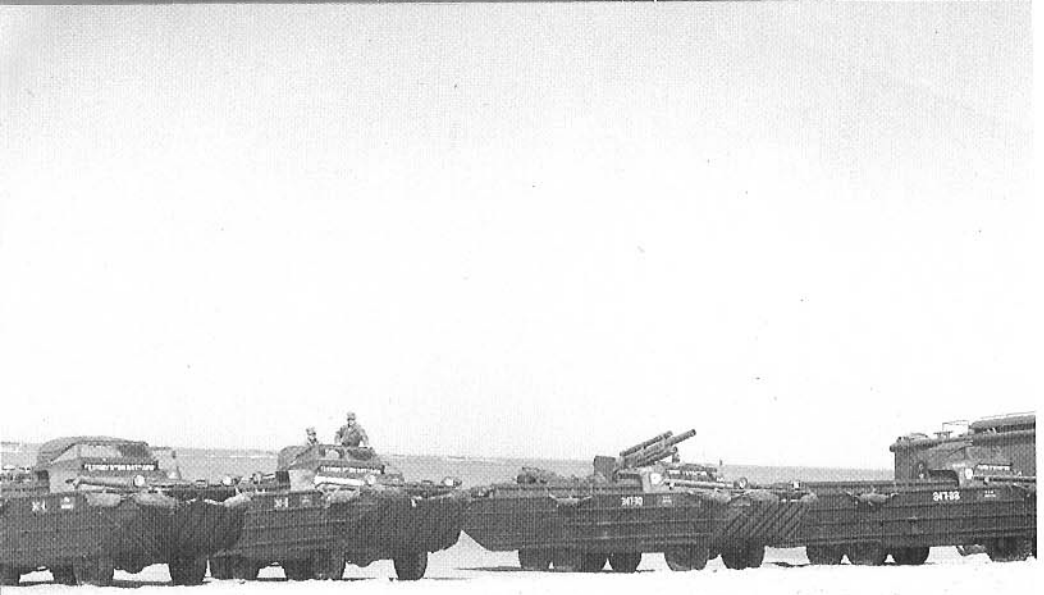


DUKWs remained active in the United States Army — this DUKW company is on maneuvers in 1964.

This supply transfer point on the beach is serviced by two mobile cranes and a crawler crane.

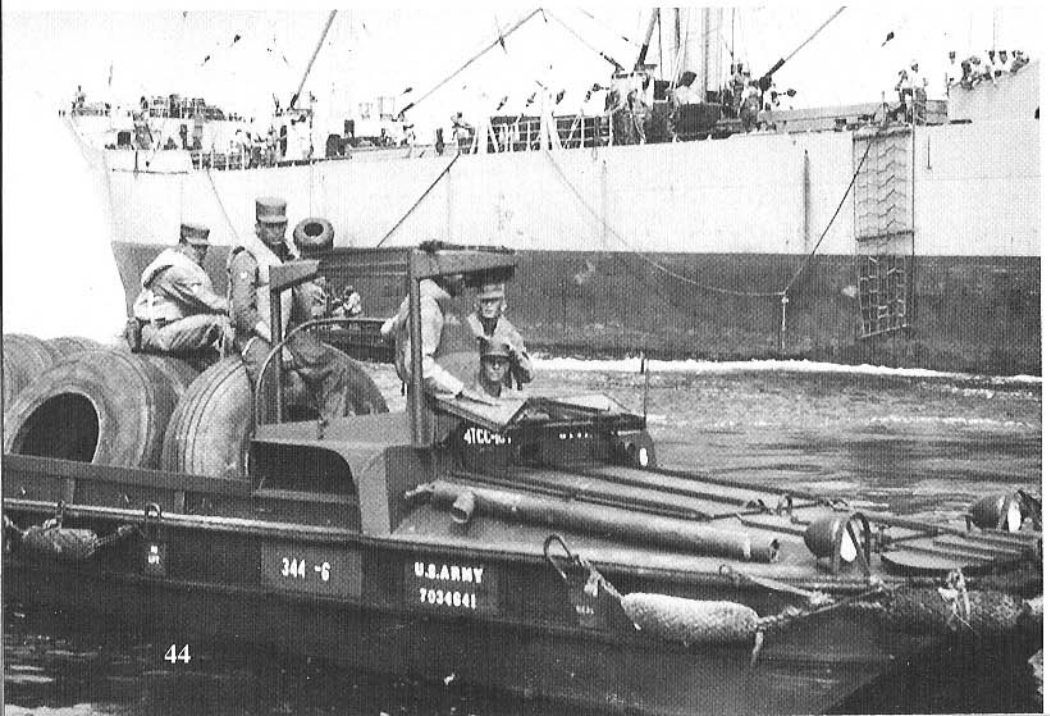
DUKWs pull along side the Army's FS 790 in preparation for off loading.

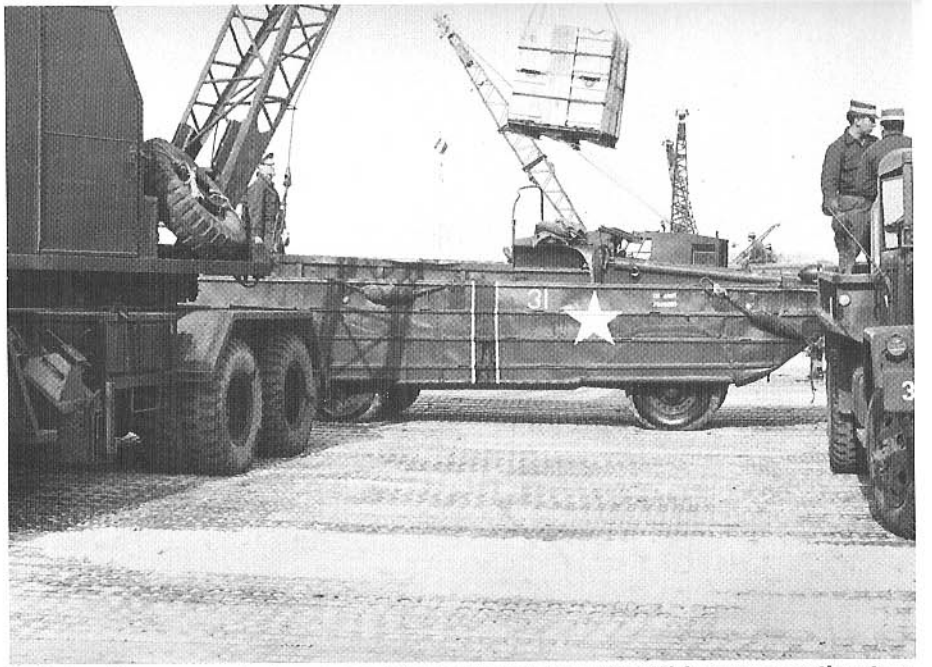




These DUKWs are lined up displaying the various kinds of cargo they load and unload including a 105mm howitzer.

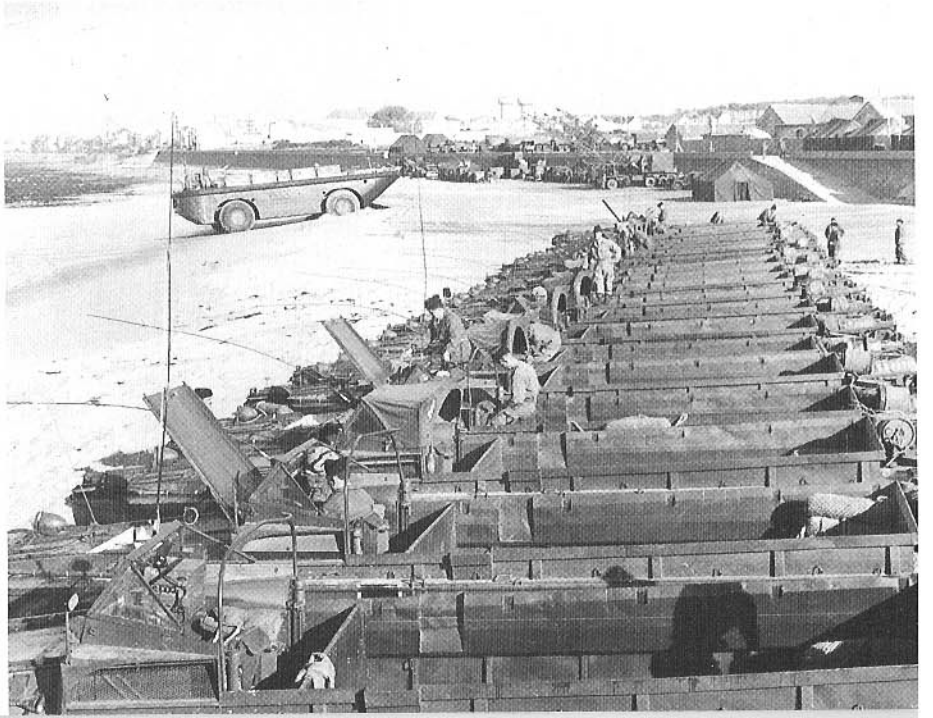
A DUKW carrying a load of tires moves toward the beach, break bulk cargo such as this was easily loaded and off-loaded by the versatile DUKW.

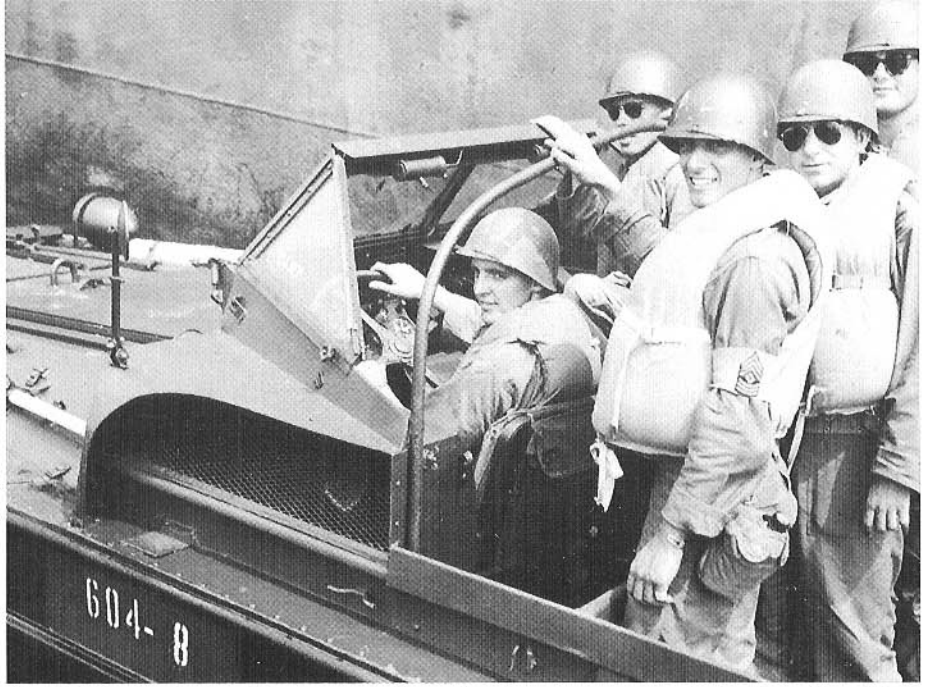




Pallets of cargo are being moved from a truck to a DUKW for transporting to a ship waiting out at sea. The basic mission of the DUKW basic stayed the same from its inception through to Vietnam.

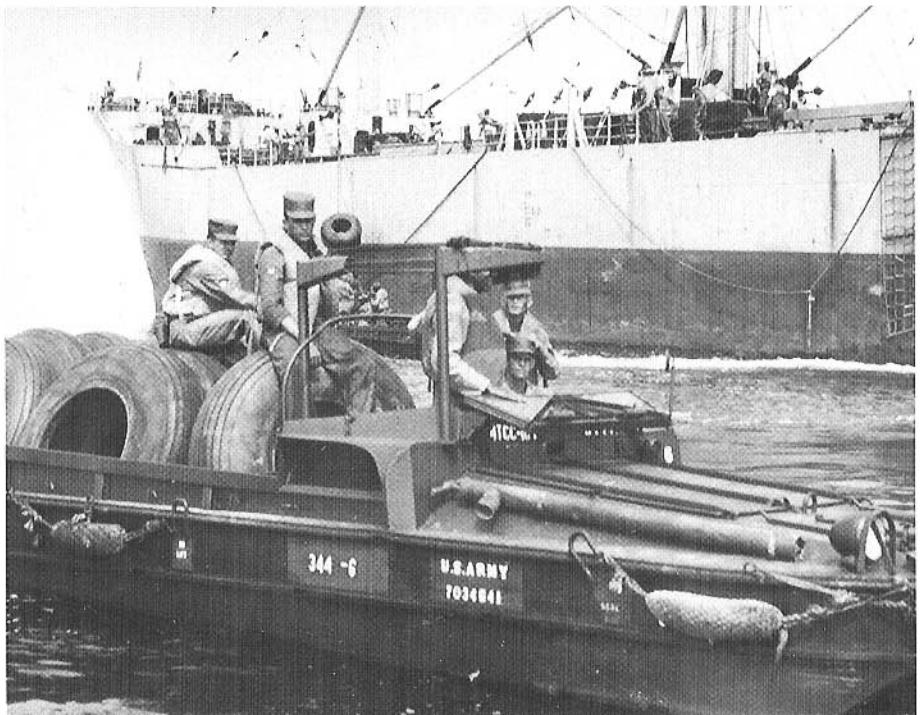
At a coastal supply point, crews carry service their vehicles while the larger brother of the DUKW, the Lighterage Amphibious Resupply Craft (LARC), sits at the far end of the beach.





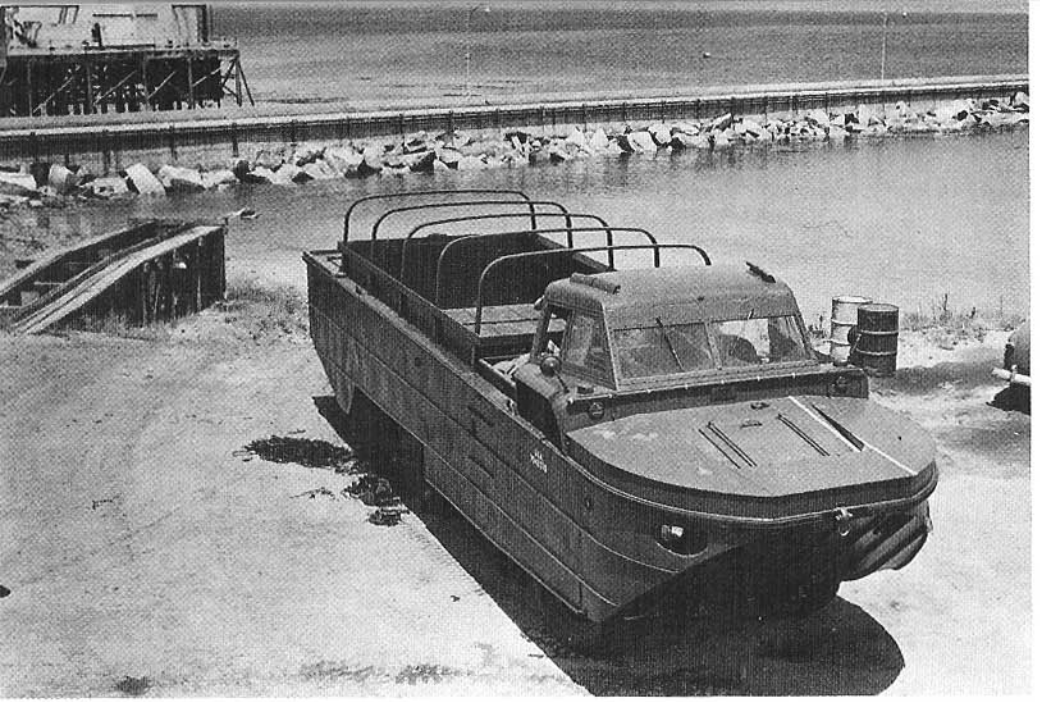
A DUKW loaded with several important passengers, including the First Sergeant, pulls along side a ship during a training exercise.

The DUKW continued to serve until the Vietnam war when it was replaced by the LARC and Barge Amphibious Resupply Craft (BARC). Several types of LARCs can be seen.



In order to provide mobility to fuel bladders they were formed in the shape of tires and attached to a simple axle and frame assembly. These bladders were easily towed by a DUKW on land or in shallow water and provided ready.

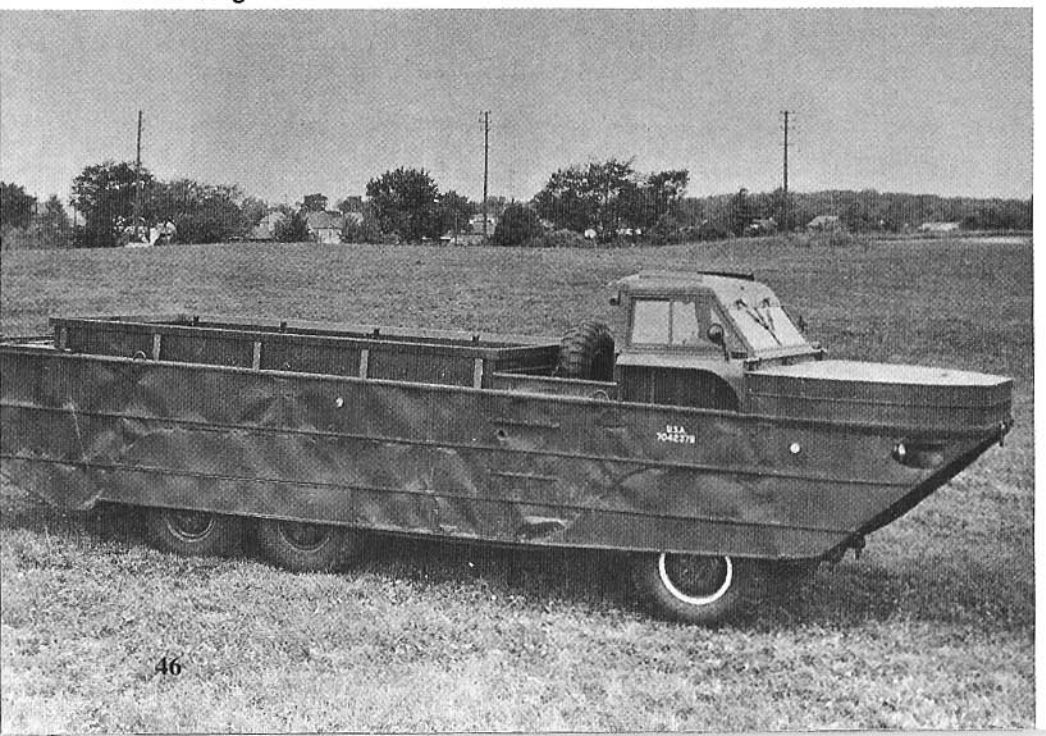
The size of the BARC, the big brother of the DUKW, put it in a price category that was far too expensive and the project was canceled.

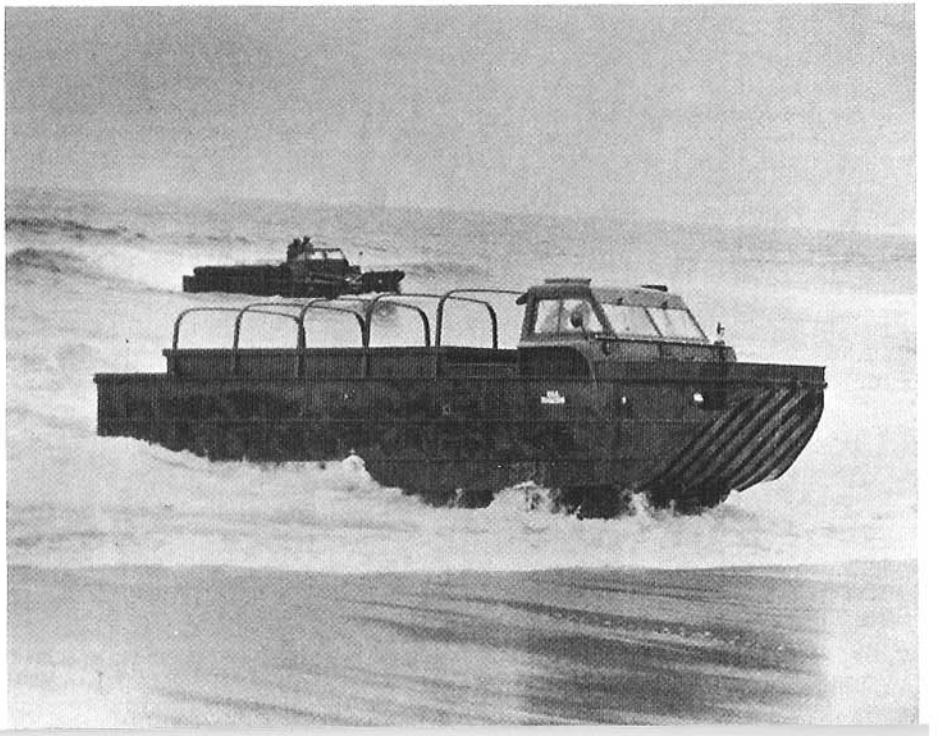


The new Super XM147 "Super" DUKW featured an improved all metal cab with sliding glass side windows. The new vehicle was equipped with 15.50 X 20 tires.

A side view of the Super DUKW. The buckled metal panels of the Super DUKW attest to its heavy use. Note the placement of the spare tire and stepped sides of the cargo bed.

(Above and below) The Super DUKW demonstrates its surf capabilities. The larger craft could easily handle rough surf conditions. The 145 hp engine gave it a road speed of 48 mph and water speed of just over 10 mph. In the lower picture an ordinary DUKW can be seen in the background.

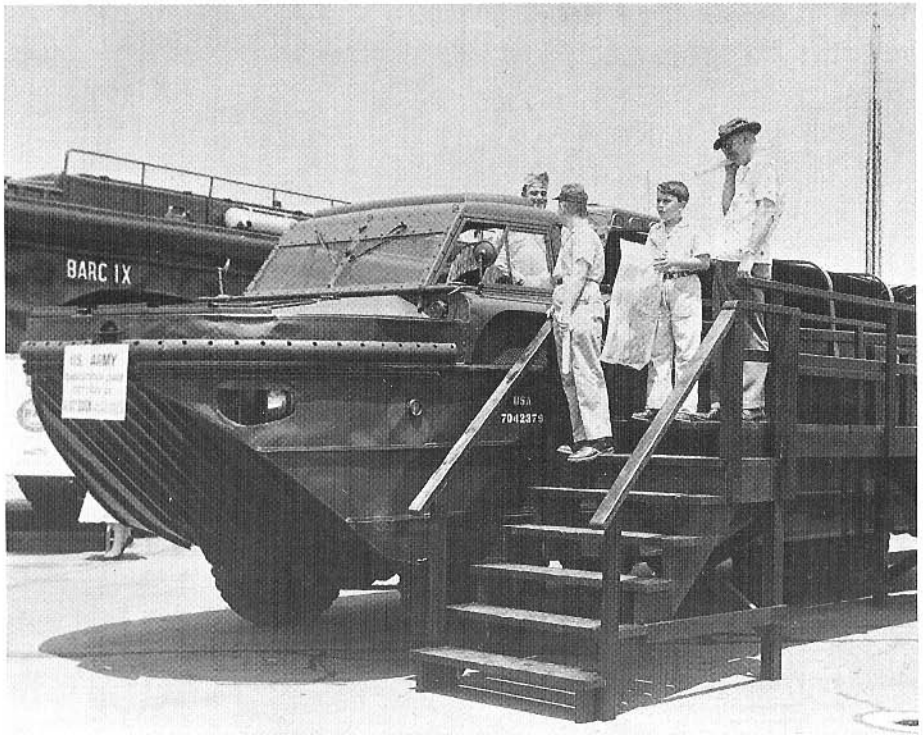


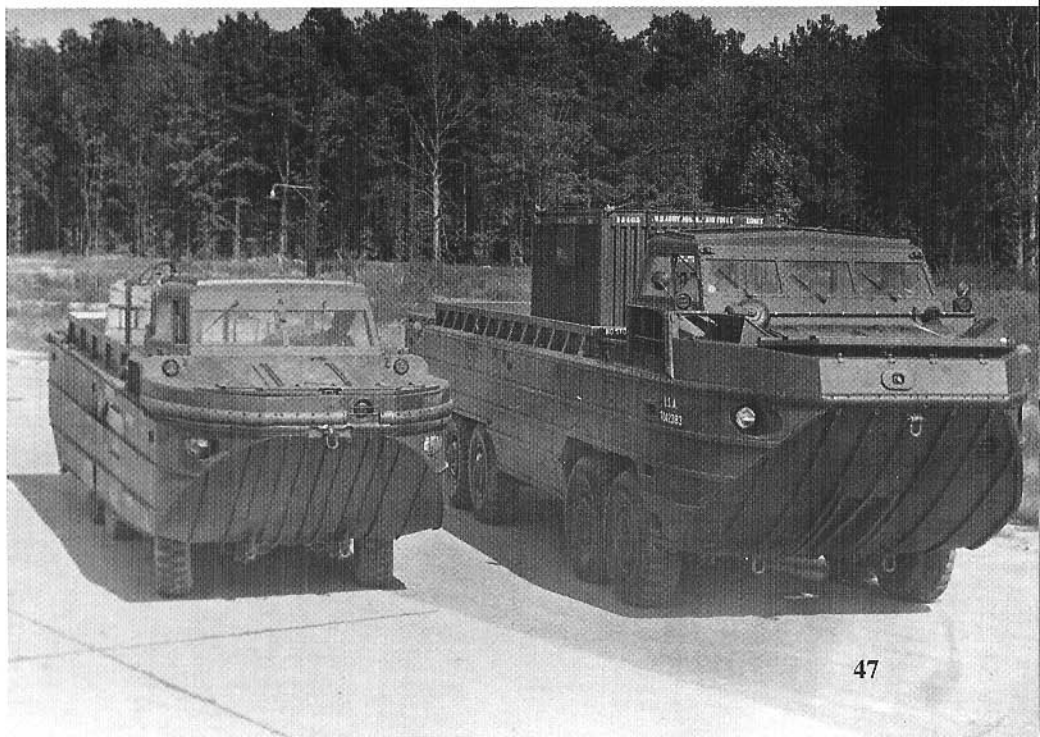


(Above and Below) The height of the cargo bed is obvious and made off loading a difficult proposition at best. The inability to quickly off load the cargo led to cancellation of the project.

The new Super DUKW can carry four tons of cargo and the cargo bed can easily handle palletized cargo.

The Super DUKW on display next to its big brother the XM-157 DRAKE. The eight wheeled DRAKE could carry 8 tons of cargo. Including the heavy, high security CONEX boxes.





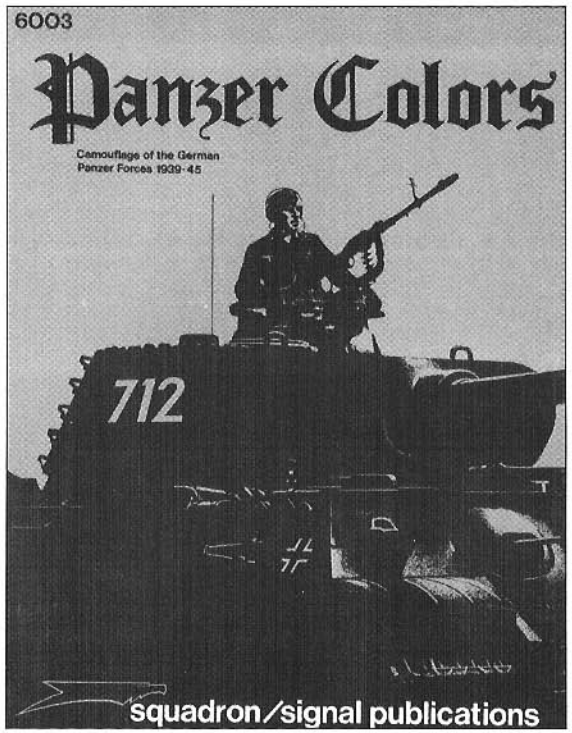
(Above) The Metropolitan Police Underwater Recovery Unit in Boston, Massachusetts (now the Massachusetts State Police) used two DUKWs in the 1970s. They were named "Donald" and "Daisy". (Massachusetts State Police via Trooper John F. Reilly)

(Above) "Donald", in full police livery, is put through its paces. (Massachusetts State Police via Trooper John F. Reilly)

(Below) "Daisy" and her crew prepare for a mission. (Massachusetts State Police via Trooper John F. Reilly)

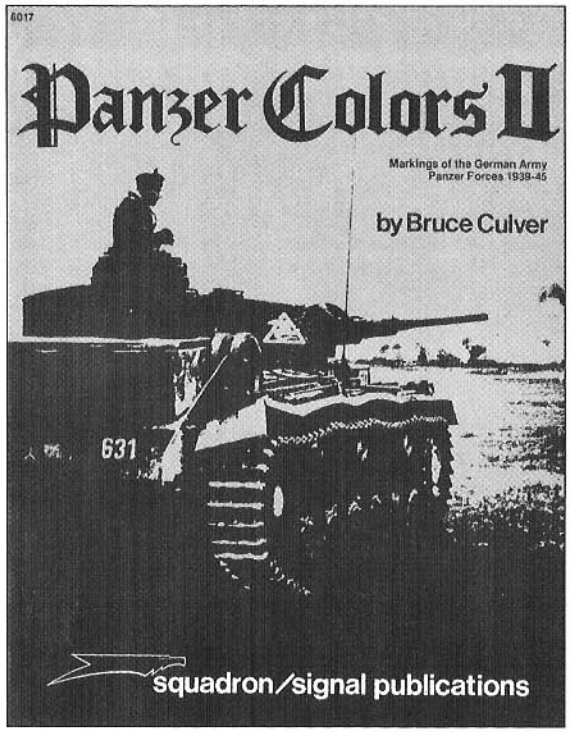
Rain, shine, sleet, snow, and even ice does not deter the Massachusetts State Police from carrying out a mission. (Massachusetts State Police via Trooper John F. Reilly)

PANZER COLORS



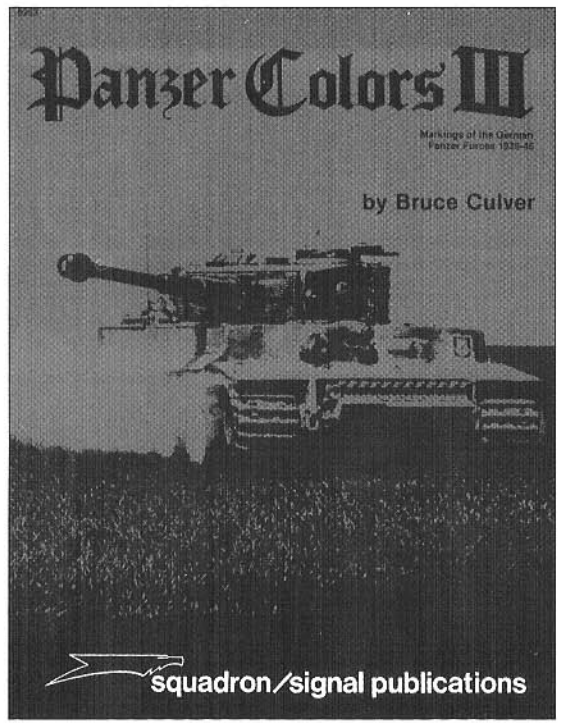
6251 Panzer Colors I

Camouflage of the German
Panzer Forces 1939-45



6252 Panzer Colors II

Markings of the German Army
Panzer Forces 1939-45



6253 Panzer Colors III

Markings of the German
Army Panzer Forces 1939-45

This three volume Reference Library is a magnificent study of the colors and markings used by the German armored forces during World War Two. From the frozen steppes of Russia to the burning sands of North Africa, from the blitz in Poland to the Battle of the Bulge, it's all here in exacting detail. The end result of years of meticulous research by the authors, these volumes contain hundreds of photos, each volume has 96 pages and is illustrated with 16 pages of color by the world renowned military artist Don Greer.

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The DUKW could quickly move men and material across lakes and rivers, as well as dry land

(Below) With the Germans destroying every usable harbor the DUKW proved invaluable as the Allies moved north in Italy.

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